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What's New(er) with z/OS Network Performance Monitoring with OMEGAMON?

OMEGAMON XE for Mainframe Networks v5.1.1

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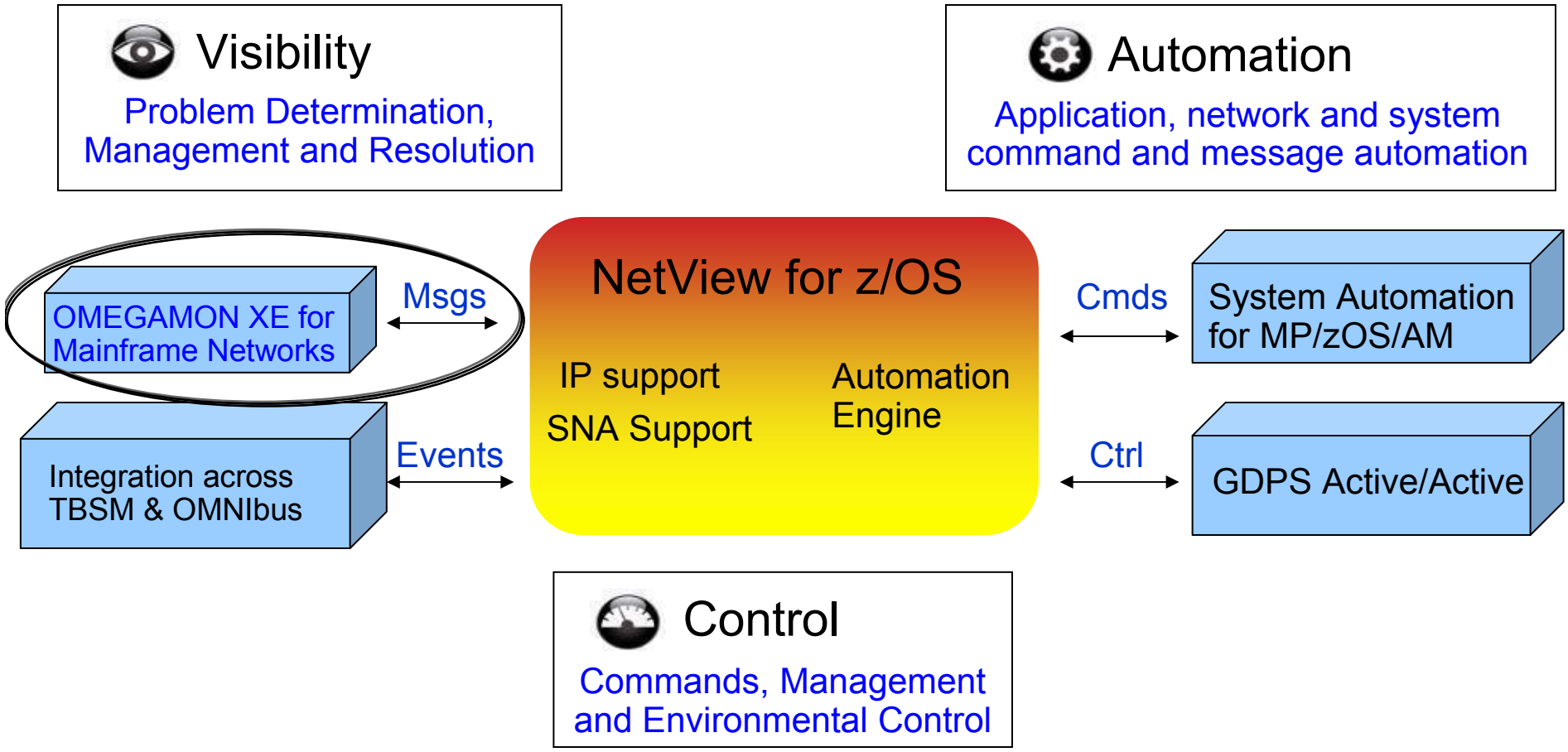
SHARE in Boston

Increasing visibility with mainframe monitoring can improve availability across entire Enterprise

Key Takeaways

- IBM has provided leadership and best practices with System z Service Management Visibility, Control and Automation capability for years
- Enterprise-wide Monitoring and Management provides much better availability and performance results than individual separate products
- IBM's System z OMEGAMON family addresses key requirements, including reducing risk and decreasing costs, with improved productivity

OMEGAMON for Mainframe Networks is a key part of the Integrated Service Management Ecosystem



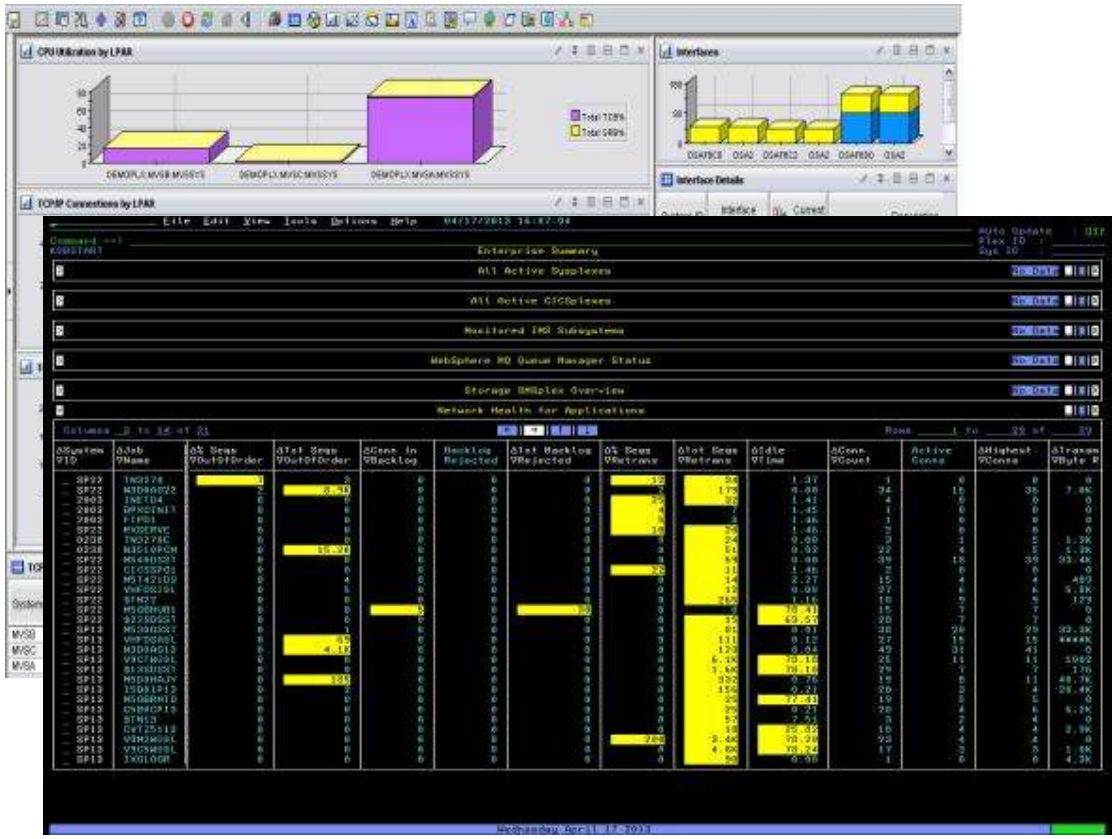
NetView for z/OS and OMEGAMON for Mainframe Networks together create single view of enterprise networks

NetView for z/OS — Network Availability

OMEGAMON XE for Mainframe Networks — Network Performance

- Common user interface integrates TCP/IP data from both NetView for z/OS and OMEGAMON XE for Mainframe Networks.
- Integration function provides customers with a consolidated TCP/IP workbench
  - Allowing management of both TCP/IP availability and performance from the same user interface.
- Smart IP tracing to immediately learn where poor or unstable TCP/IP connections hamper application performance

OMEGAMON Version 5 …
Monitoring the z/OS sub-systems



OMEGAMON XE z/OS V 5.1.1

OMEGAMON XE CICS V 5.1

OMEGAMON XE DB2 V5.1.1

OMEGAMON XE IMS V5.1

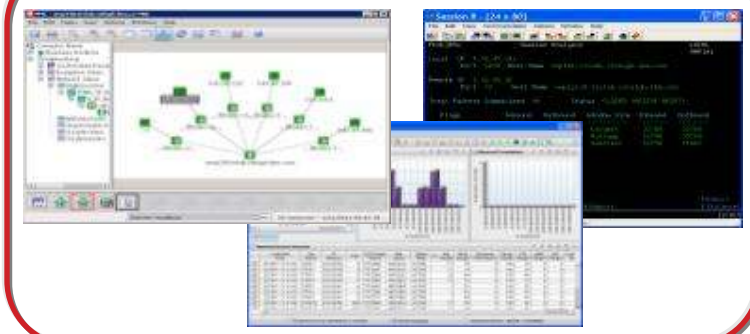
OMEGAMON XE Storage V5.1

OMEGAMON XE Messaging V7.1

OMEGAMON XE for Mainframe Networks V5.1.1

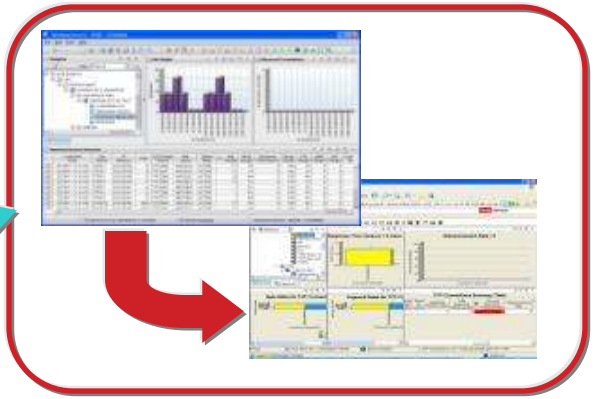
OMEGAMON for z/OS Management Suite V5.1

All the components work together to keep applications and services available

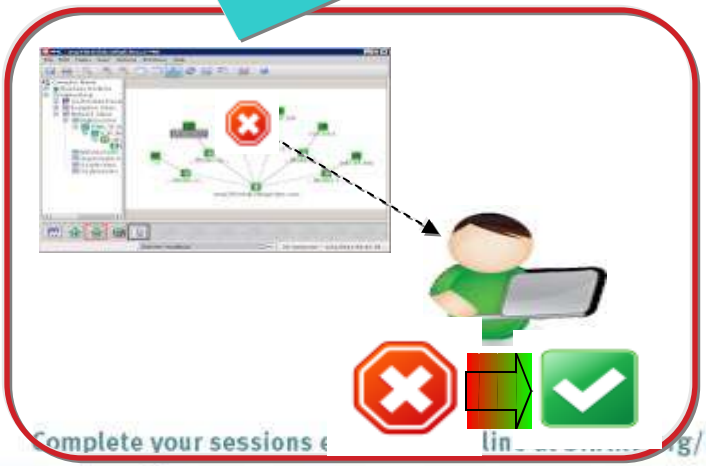


Role appropriate views of right data at right time

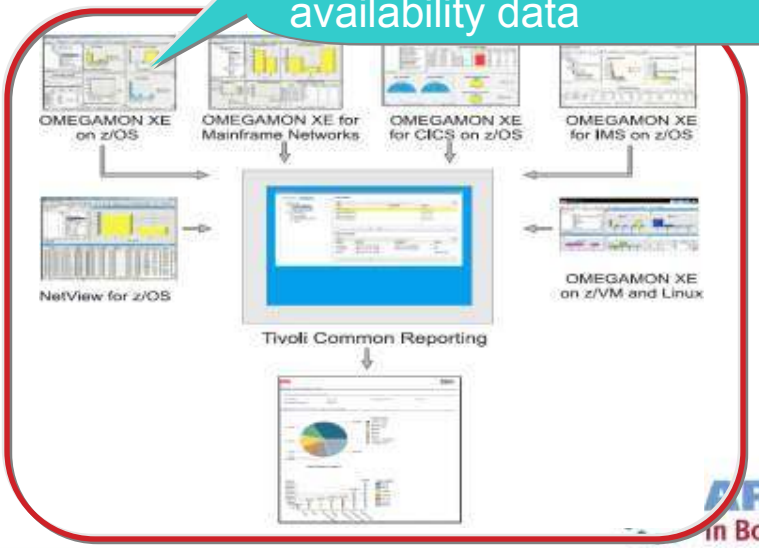
Rapid problem diagnostics via common UI and drill down between products



Alert me when thresholds breeched and enable to automate corrective actions



Consistent historical views of resource performance and availability data



Business Agility with improved IT visibility now available with OMEGAMON V5 family

Modernized and strengthened OMEGAMON product line for reduced resource usage and faster problem resolution

Increased System Availability with faster problem resolution

- Enhanced 3270 User Interface for SMEs
- Built-in Problem Solving Scenarios

Improved Productivity with simplified information

- Faster Install/Configuration/Maintenance
- zEnterprise monitoring across z196/114 and zBX

Reduced Costs with decreased resource usage

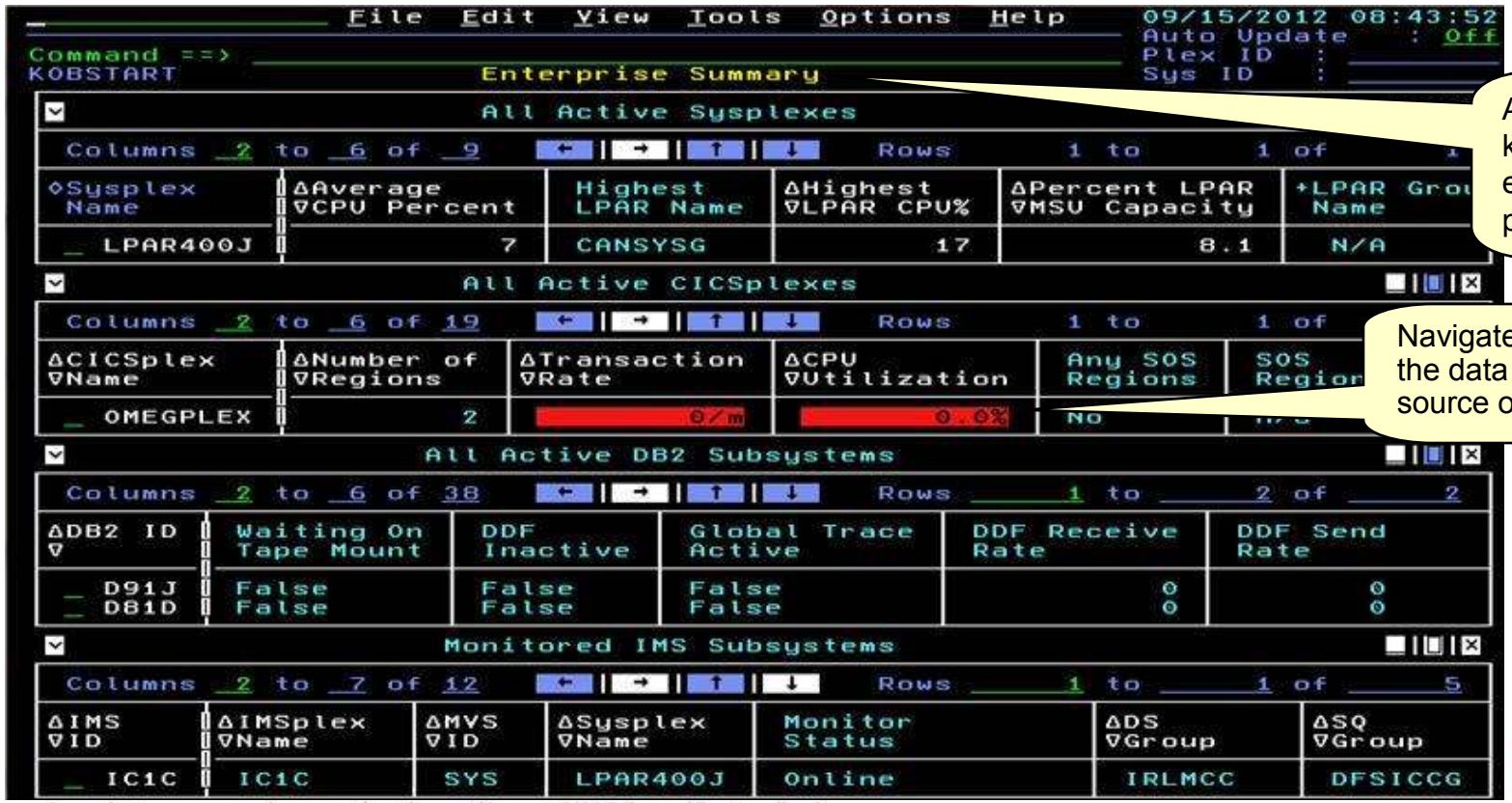
- Usage of zIIP specialty servers
- Simplified OMEGAMON architecture

Individual products provide additional capability

Enhanced 3270 user interface creates Enterprise wide view of information for improved availability

- Understand transactions across your enterprise
- Color coding to provide ability to find and resolve problems quickly
- Eliminates need to move between multiple screens and monitors

"GUI on a green screen"



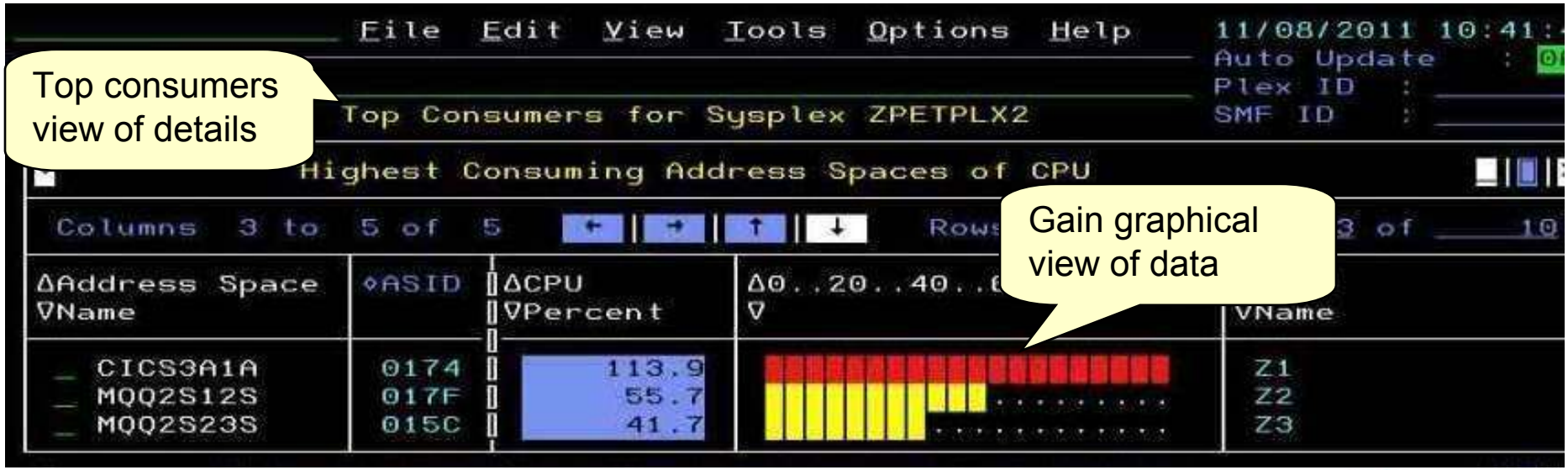
At a glance, view key information for each OMEGAMON product

Navigate quickly through the data to identify the source of a problem

Customer prioritized problem solving scenarios built into enhanced 3270 user interface

Easy to see and find critical system and sub-system information for improved performance and availability across System z

- Customized screens focused on customer defined problems
- Screen content based on high priority problems
- Includes Healthcheck and Bottleneck analysis



OMEGAMON V5.1 enhanced configuration and maintenance capability with Self-Describing Agents

Faster, easier, less error-prone for improved reliability and productivity

- Eliminate monitoring outages caused by ITM Server recycles
  - Product upgrades/maintenance requires agent or RTEMS recycles only
- Eliminate maintenance upgrade errors:
  - Applies to new installs, staged upgrades, and maintenance
  - Crosschecks/validates version with installed data and framework
  - Avoids inconsistent application data in ITM framework layers
- Self-describing framework extensible to new capabilities
- Eliminates application data DVDs and CDs:
  - No extra distributed installs or upgrades for mainframe-centric customers

- Moving from 40 hours a week to 4 hours a week maintenance
- 80% improvement in time for installation and maintenance
- 30% improvement in time to configure post installation

Customer-driven improvements simplify installation and configuration using PARMGEN

Replaces ICAT as primary way to install and configure

*Before: 145 ICAT **product-centric** jobs to configure 38 components for 1 LPAR RTE*
*Today: 8 Parmgen **function-centric** jobs to configure components for 1 LPAR RTE*
Customers experiencing over 35% improvement in install and configuration time

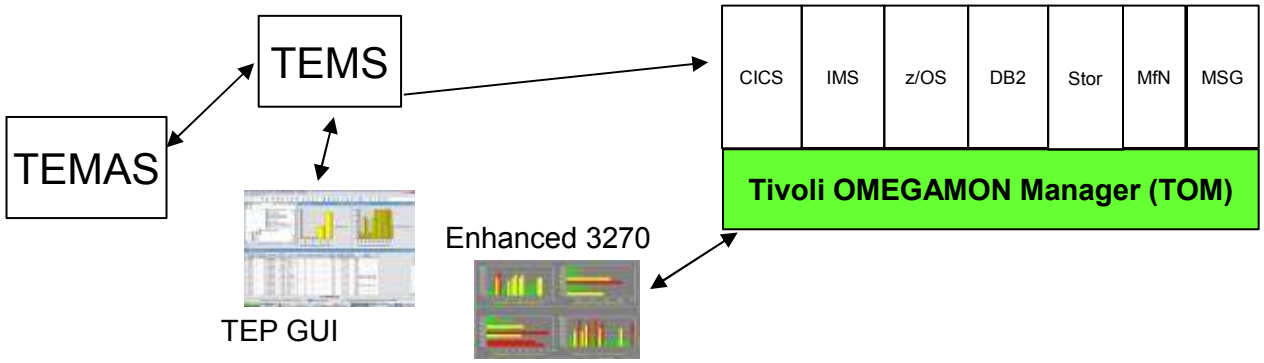
- Easy to walkthrough steps to complete configuration and customize profile
- Automatically updates hundreds of configuration artifacts, including auto-discovery of system values
- Validate parameter settings for tolerance and type
- Imports settings from an existing ICAT environment
- Re-run to change values, add or delete products

"I like using the PARMGEN approach better than ICAT. I find it much easier to make things repeatable... I like the fact that PARMGEN does not overwrite my running members"
Typical quotes from early adopters program

The overall process has been simple and quick. Total time for 3-4 products (z/OS, CICS, DB2, TOM plain vanilla) has been about 2 hours *Field Engineer*

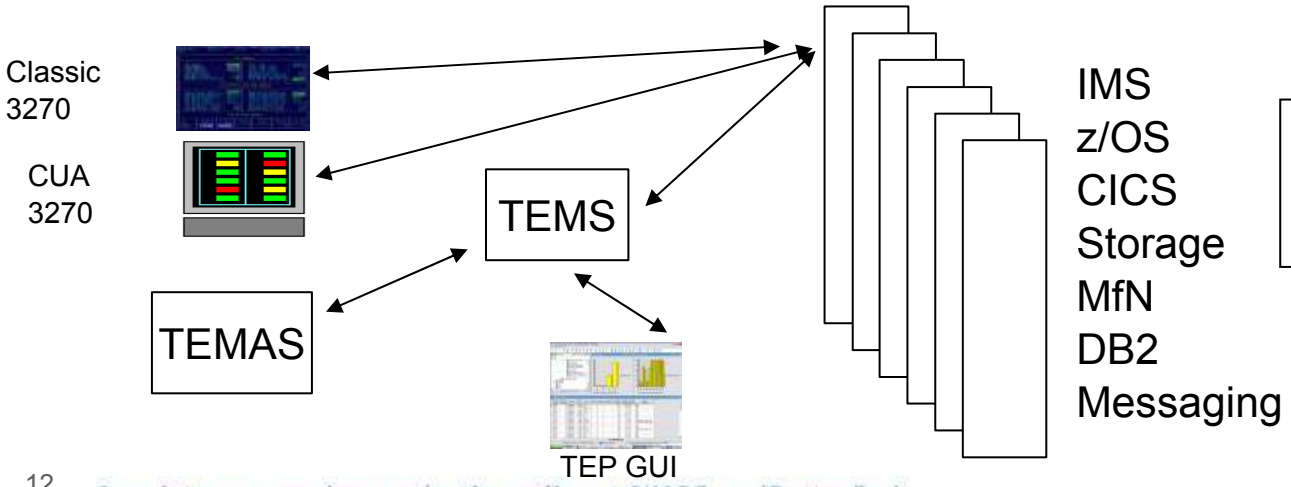
Moving to simplified architecture driving decreased resource utilization with increased value

Enhanced OMEGAMON Architecture



Single Manager and User Interface across OMEGAMON family

Current OMEGAMON Architecture



Multiple Address Spaces and User Interfaces across each OMEGAMON

OMEGAMON for Mainframe Networks V5.1/5.1.1 improves network diagnostics and management

In addition to OMEGAMON V5.1 family capability:

- Increased system availability with faster problem resolution through built-in problem solving scenarios
- Improved diagnostics and decreased CPU utilization
- Support for zEnterprise improves application availability
- Improved resource usage with more control over data collection
- Greater synergy with IBM Tivoli NetView for z/OS
- Improved management through additional Take Action commands
- Improved troubleshooting of data collection problems

OMEGAMON for Mainframe Networks V5.1.1 provides additional problem solving and UI capabilities

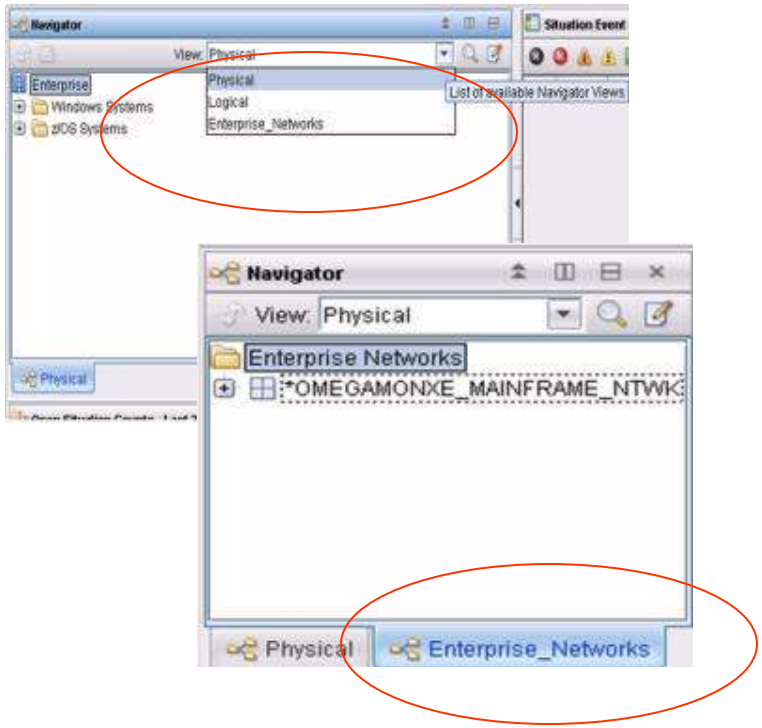
- Additional built-in problem solving scenarios:
  - FTP sessions and transfers - "hung" transfers, failed logins, applications transferring large numbers of files or data
  - Enterprise Extender and HPR - quickly identify performance problems impacting VTAM applications
  - CSM storage usage - applications holding excessive amounts of CSM storage

- Choice of user interfaces, with enterprise-wide workspaces to quickly identify, at a glance, poorly performing resources:
  - OMEGAMON Enhanced 3270 User Interface - speed and power of 3270
  - Tivoli Enterprise Portal - graphical user interface, showing network problems visually
  - Find commands enable resolution of network problems even faster

Version 5.1.1 = Version 5.1.0 + APARs OA42339 and OA42422 + Fix Pack 1

Enterprise wide views and searches in the Tivoli Enterprise Portal: Enterprise_Networks navigator

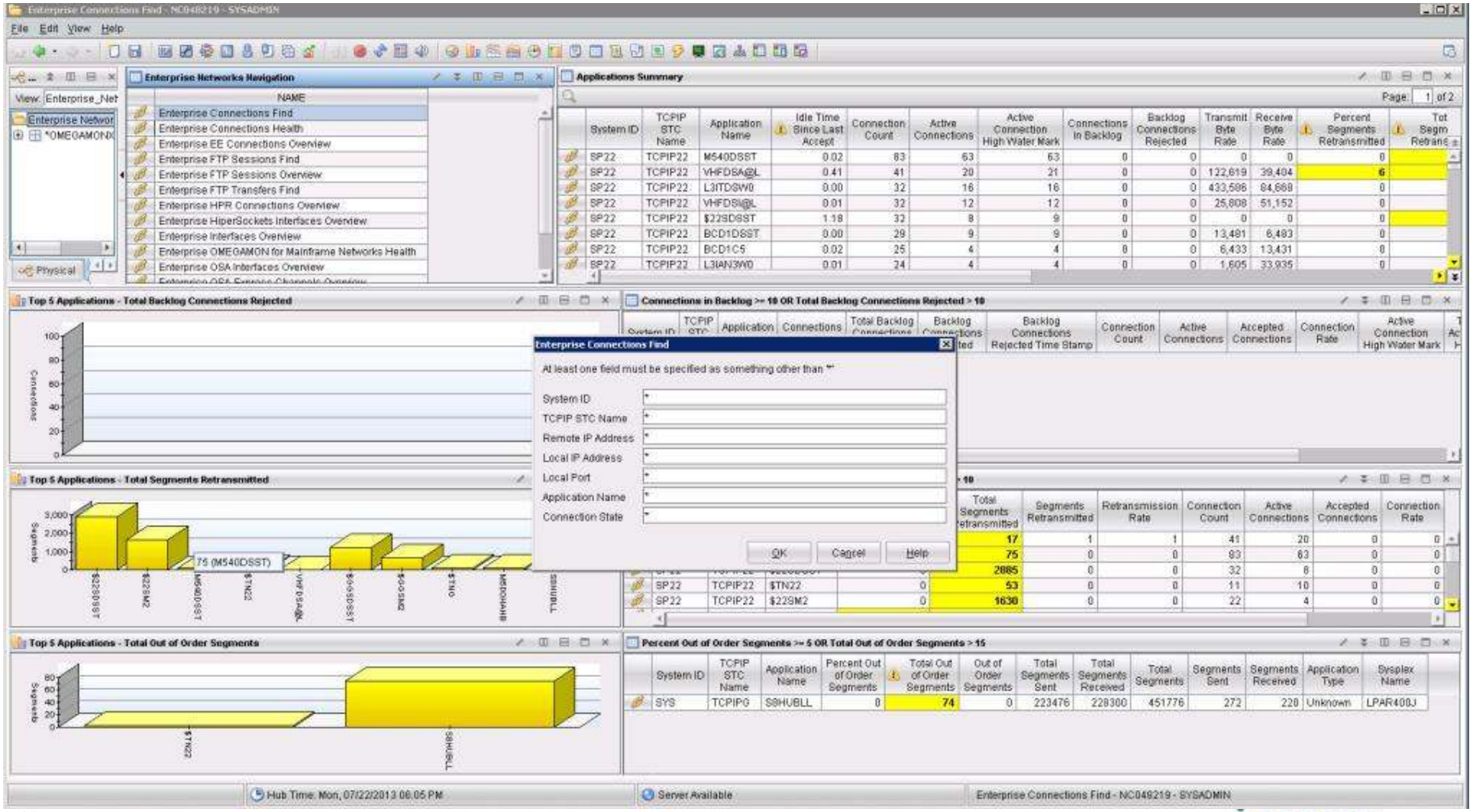
"As a network SME, I need to navigate quickly through the data, identify the source of a problem, and resolve the problem through take action commands in my current tool of choice, the Tivoli Enterprise Portal."



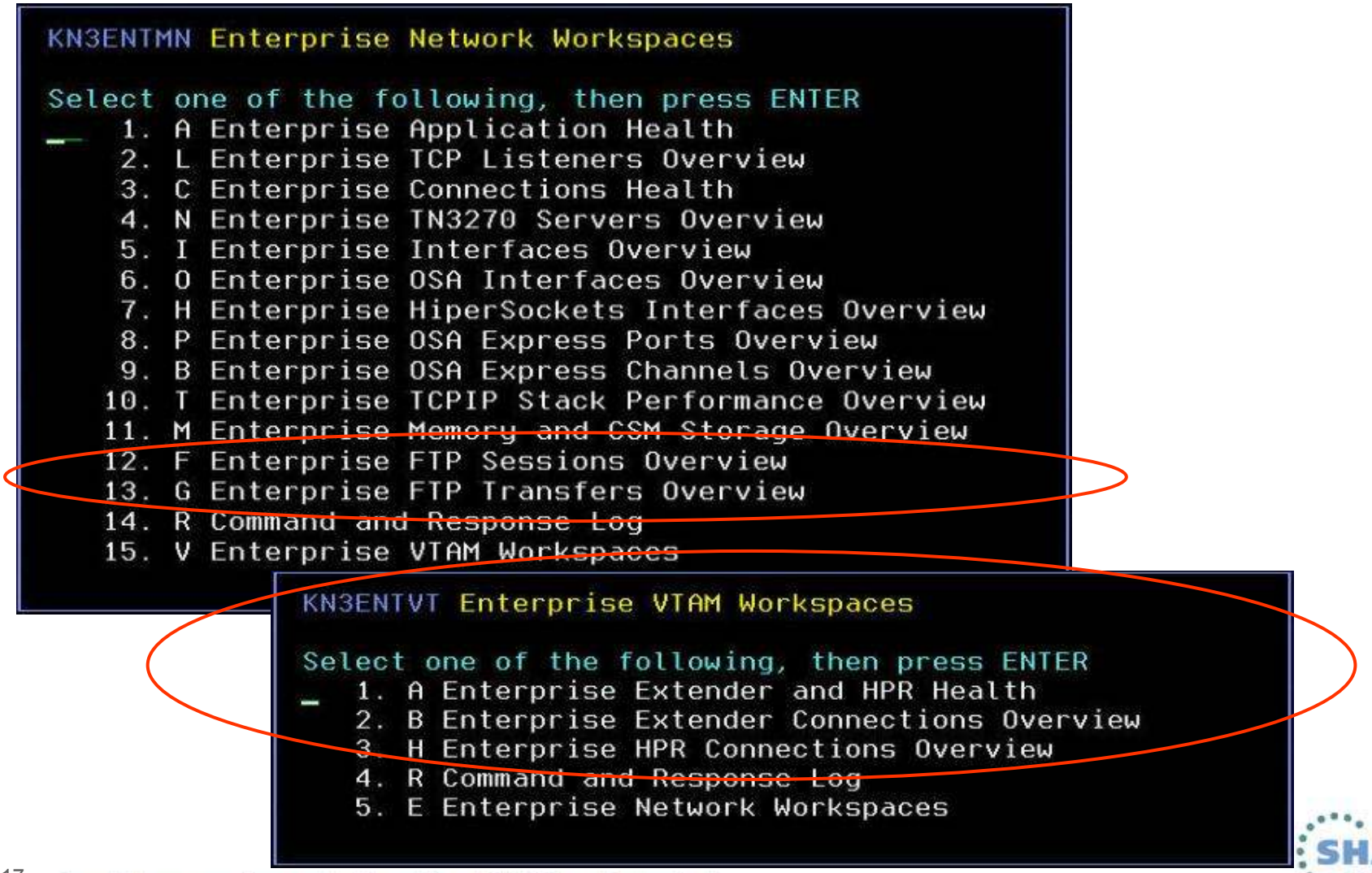
Enterprise Networks Navigation

NAME
Enterprise Application Health
Enterprise Connections Find
Enterprise Connections Health
Enterprise EE Connections Overview
Enterprise FTP Sessions Find
Enterprise FTP Sessions Overview
Enterprise FTP Transfers Find
Enterprise HPR Connections Overview
Enterprise HiperSockets Interfaces Overview
Enterprise Interfaces Overview
Enterprise OMEGAMON for Mainframe Networks Health
Enterprise OSA Interfaces Overview
Enterprise OSA-Express Channels Overview
Enterprise OSA-Express Ports Overview
Enterprise TN3270 Find
Enterprise TN3270 Server Overview

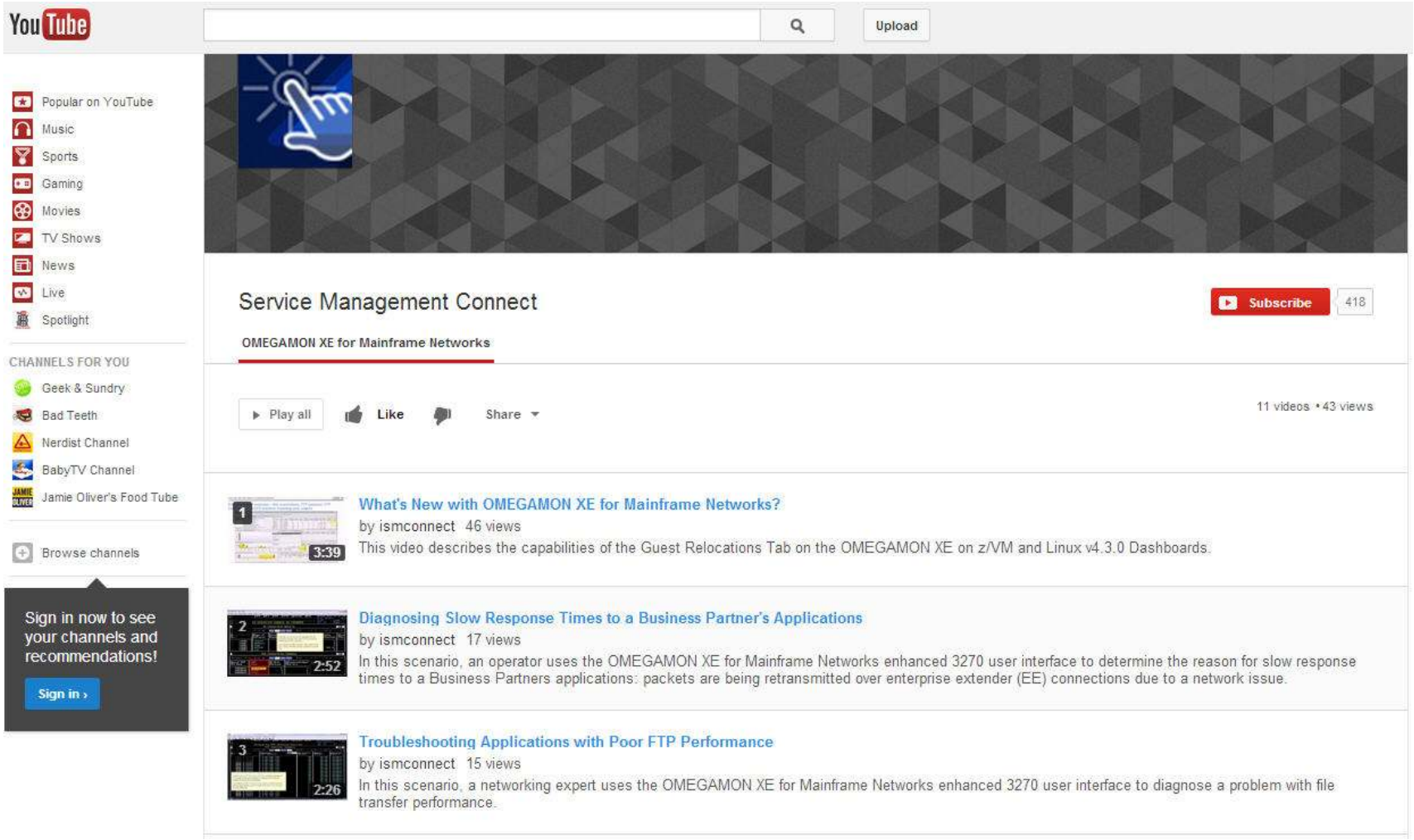
Enterprise wide searches: find TCP connections, FTP sessions, FTP transfers, or TN3270 sessions



Increased System Availability with faster problem resolution in the OMEGAMON Enhanced 3270UI



YouTube videos of problem solving scenarios:



http://www.youtube.com/playlist?list=PLiD3_RDV00JcpfI2GCf2mPqprba2KZCsP

Scenario:
Why can't users access an application?

The setting:

Saurabh, the network expert, is receiving reports of several users having issues accessing an application. He has one user's IP address and plans to use it to research this issue.

He decides to try the new OMEGAMON for Mainframe Networks Enterprise Connection Find workspace to debug the problem.

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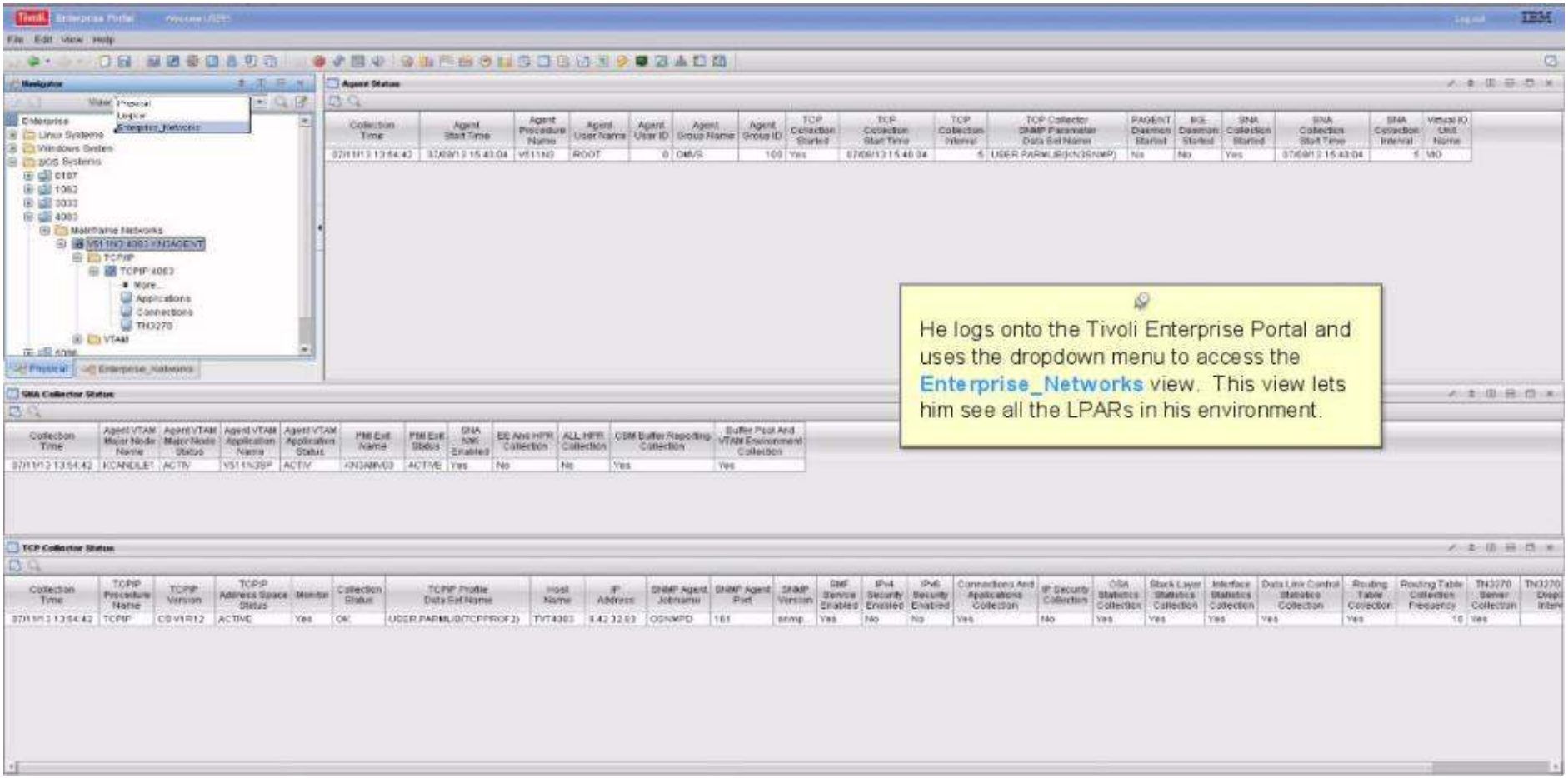
Why can’t users access an application?



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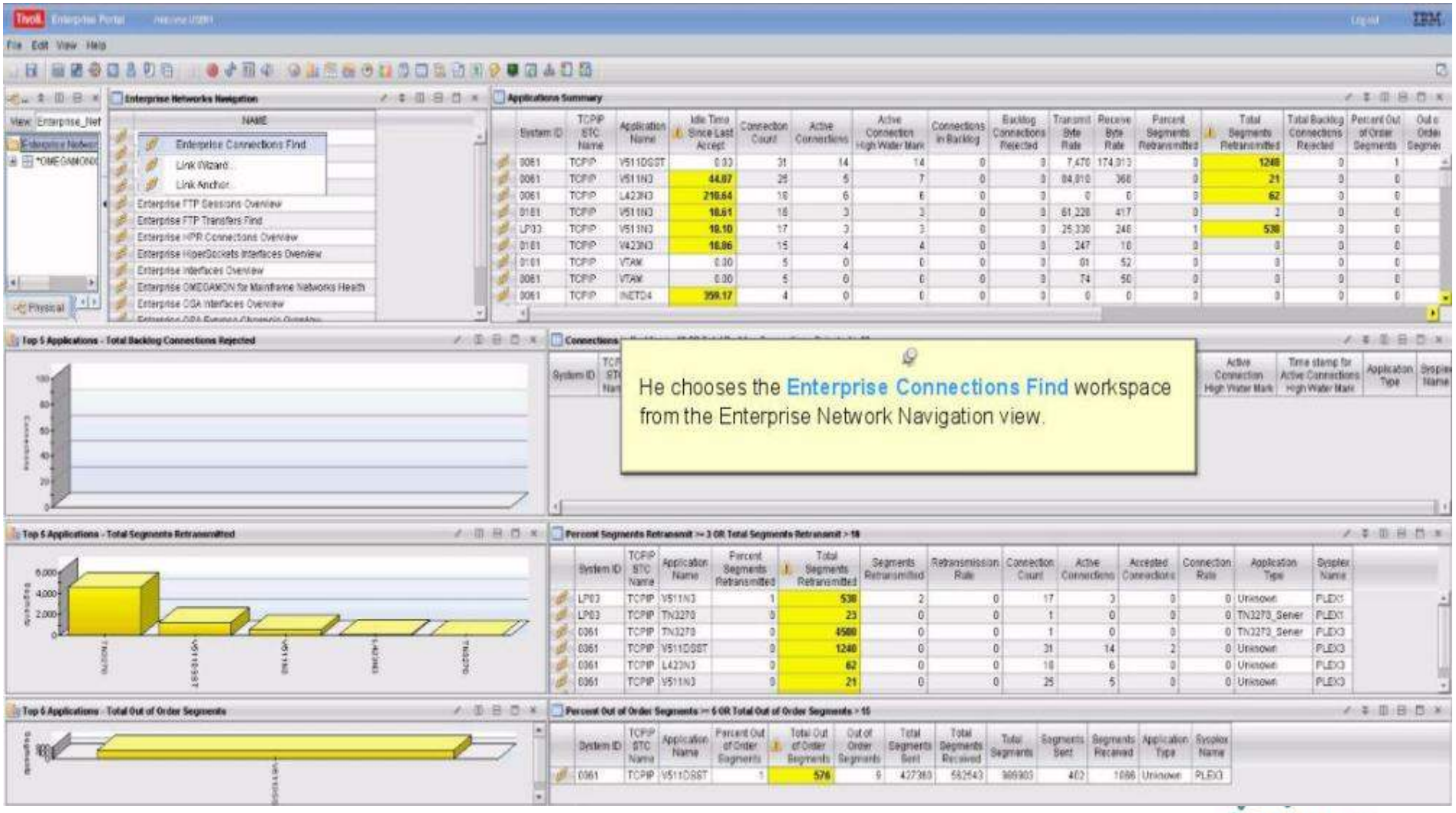

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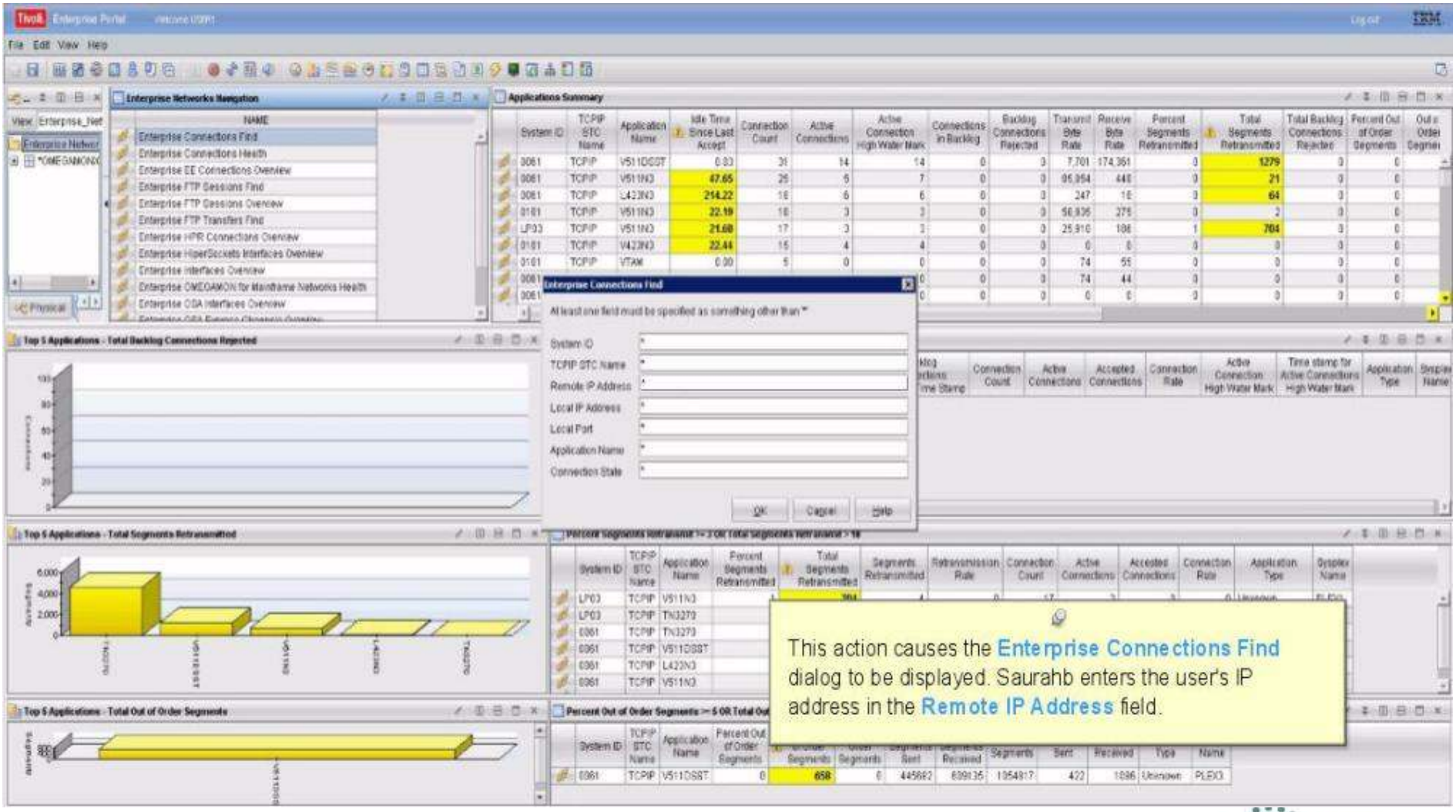

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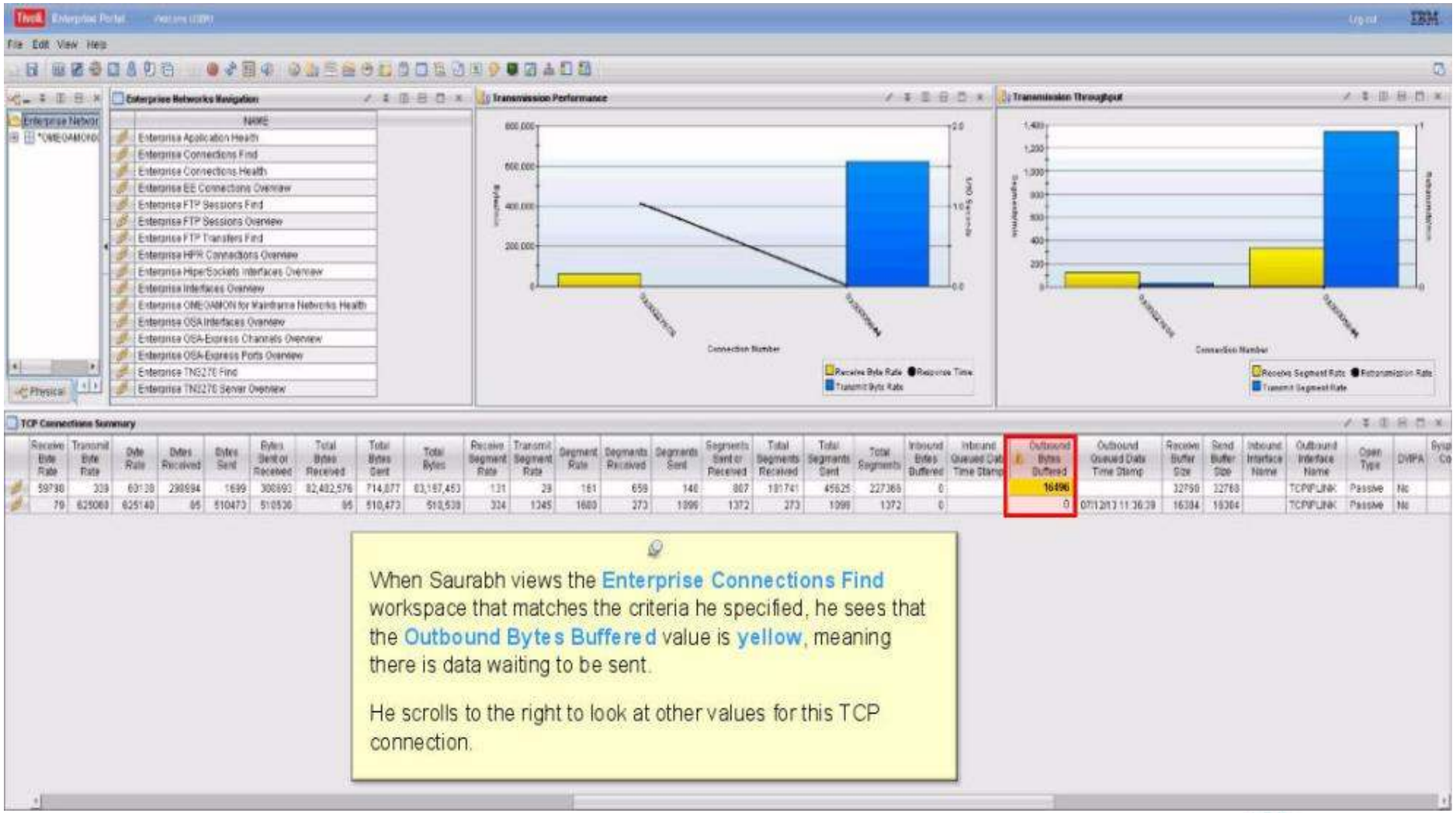

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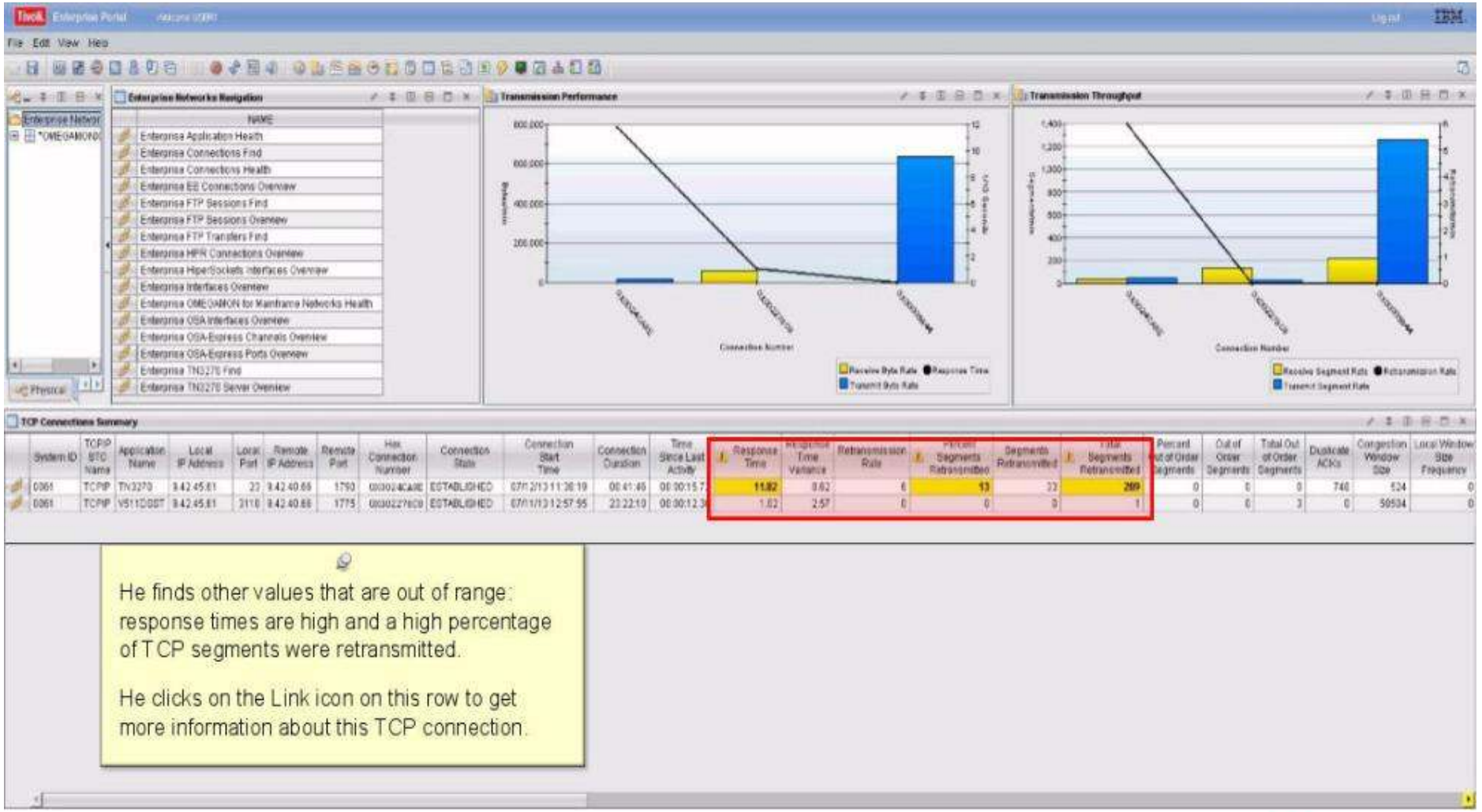

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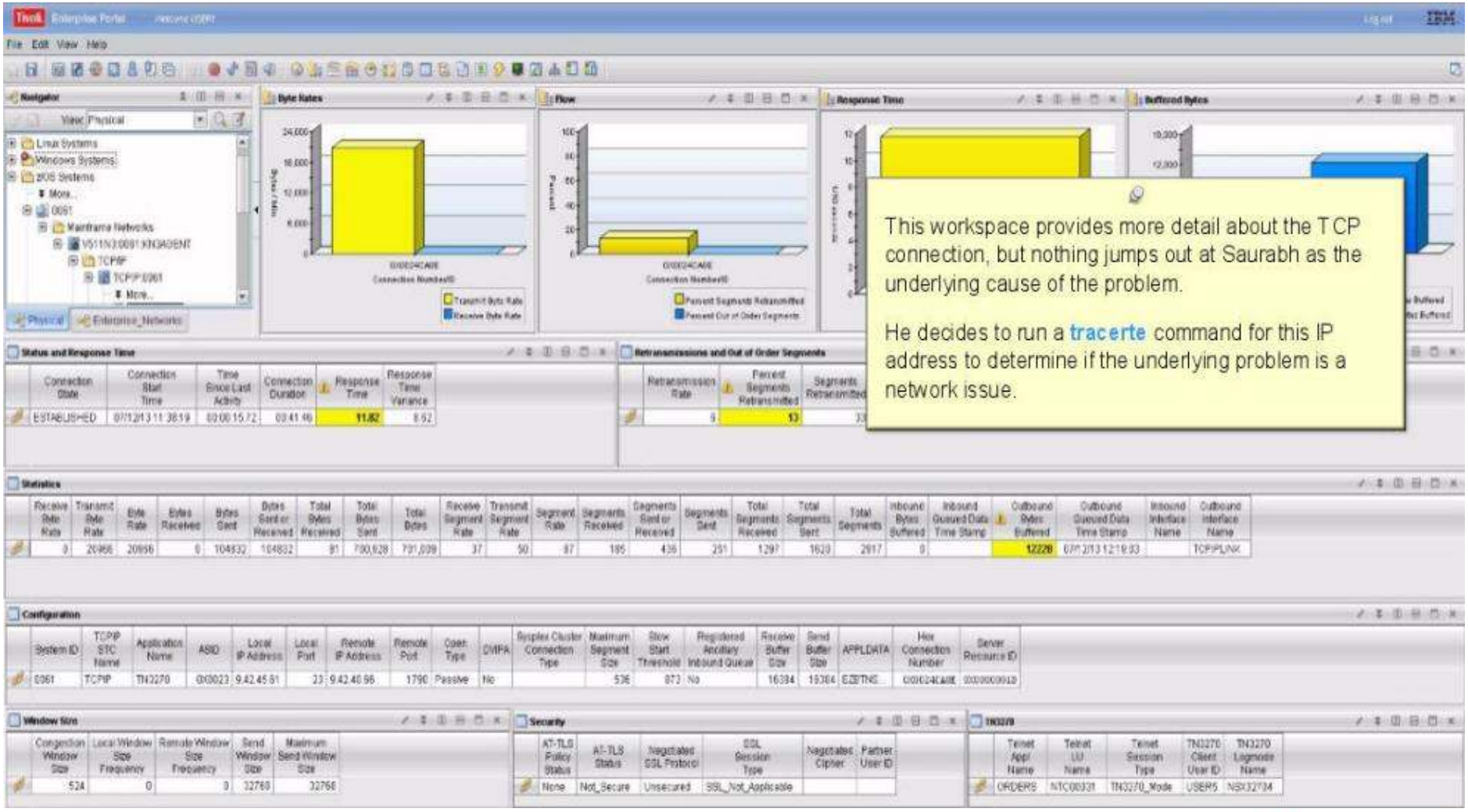

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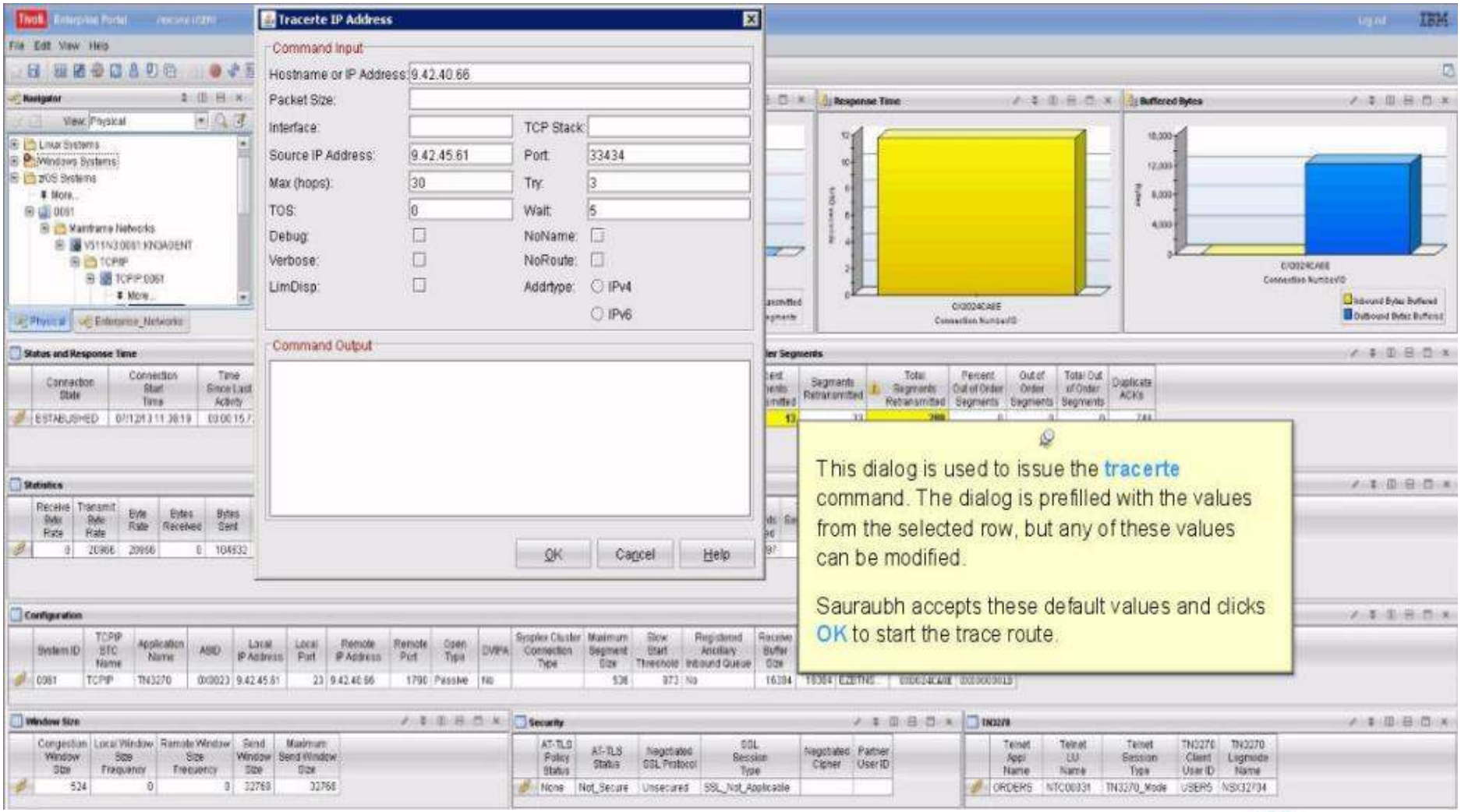

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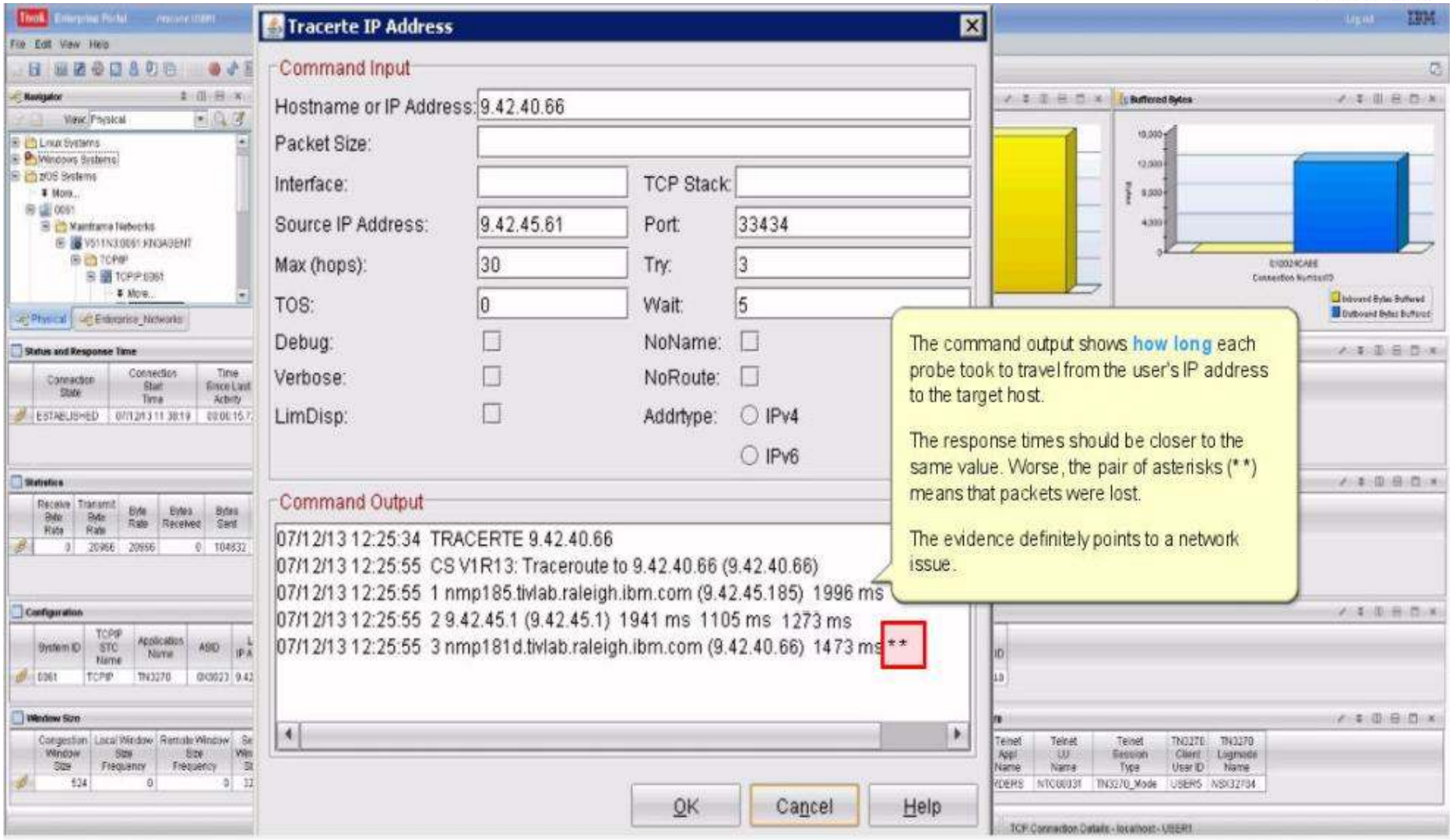


Why can't users access an application?

Using tracerte, Saurabh has determined that the problem is a network issue. He sends this trouble ticket to the IT support group for resolution.

The OMEGAMON for Mainframe Networks FIND function helped Saurahb to quickly identify the source of his problem and move toward a resolution.

Scenario:

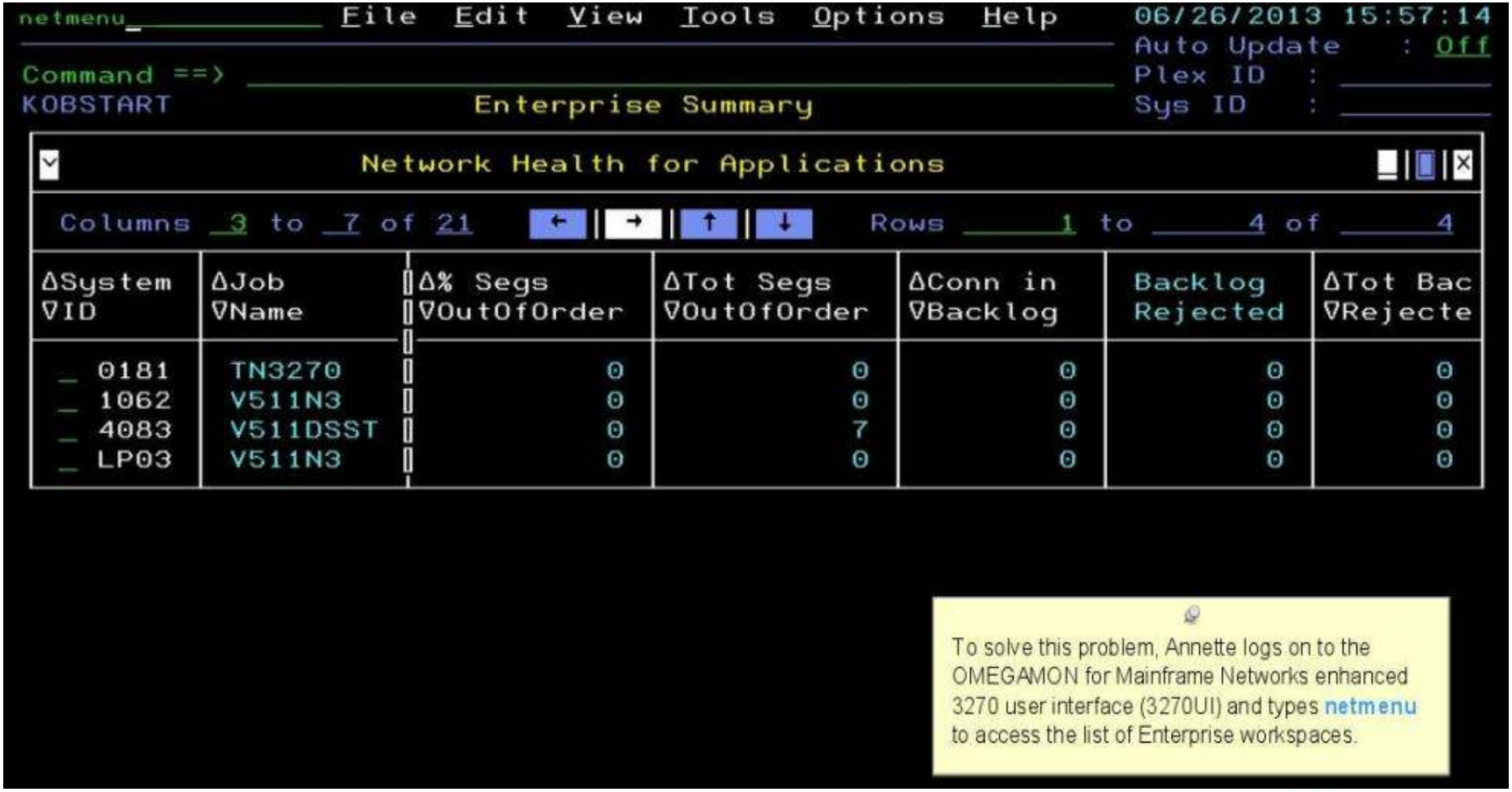
What is slowing down my business partner's applications?

The setting:

Annette is an Operations Analyst.

Today, she received reports of slow response time with a Business Partner's application. She knows that the Business Partner's network is connected to her company's network through Enterprise Extender (EE) Connections..

What is slowing down my business partner's applications?



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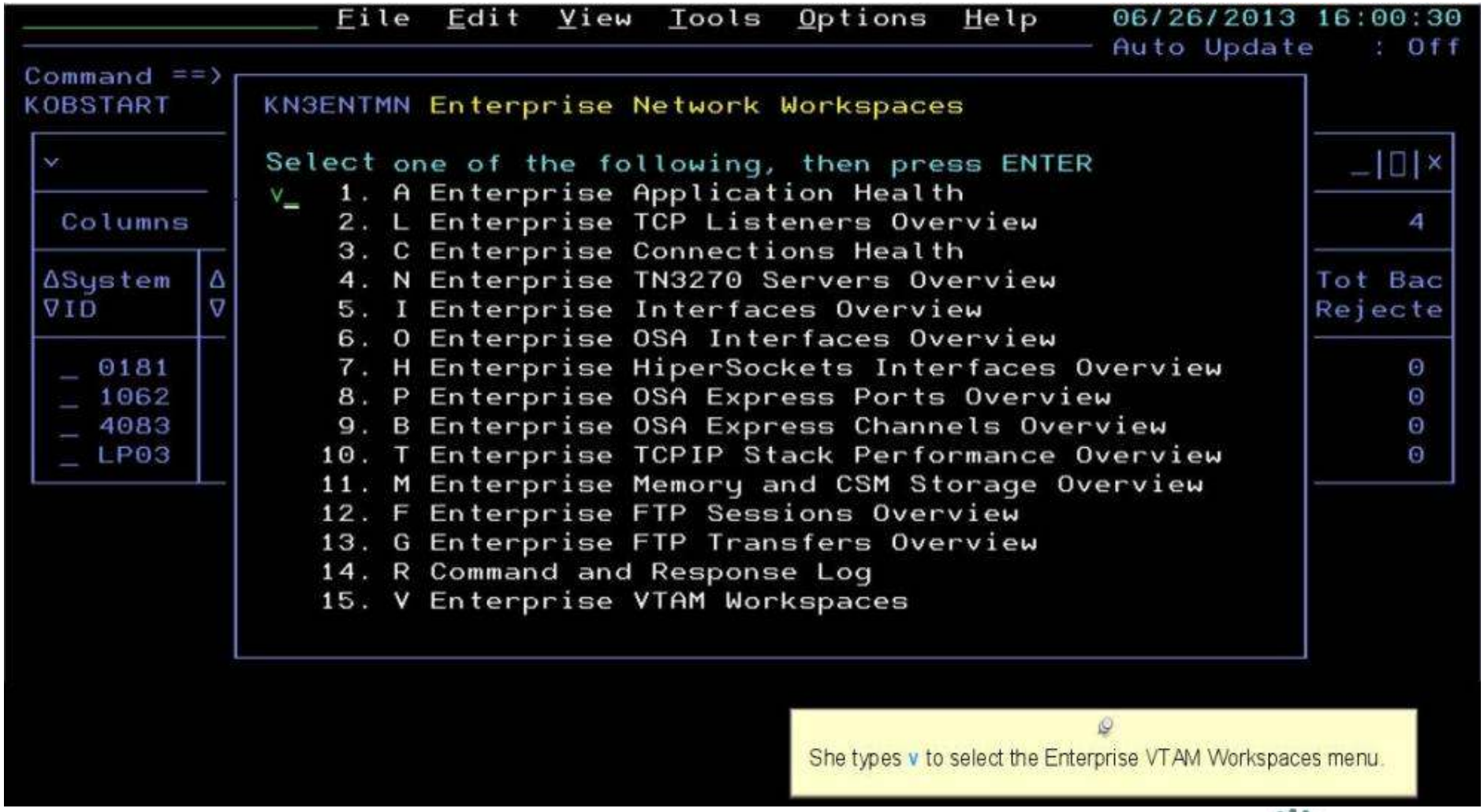

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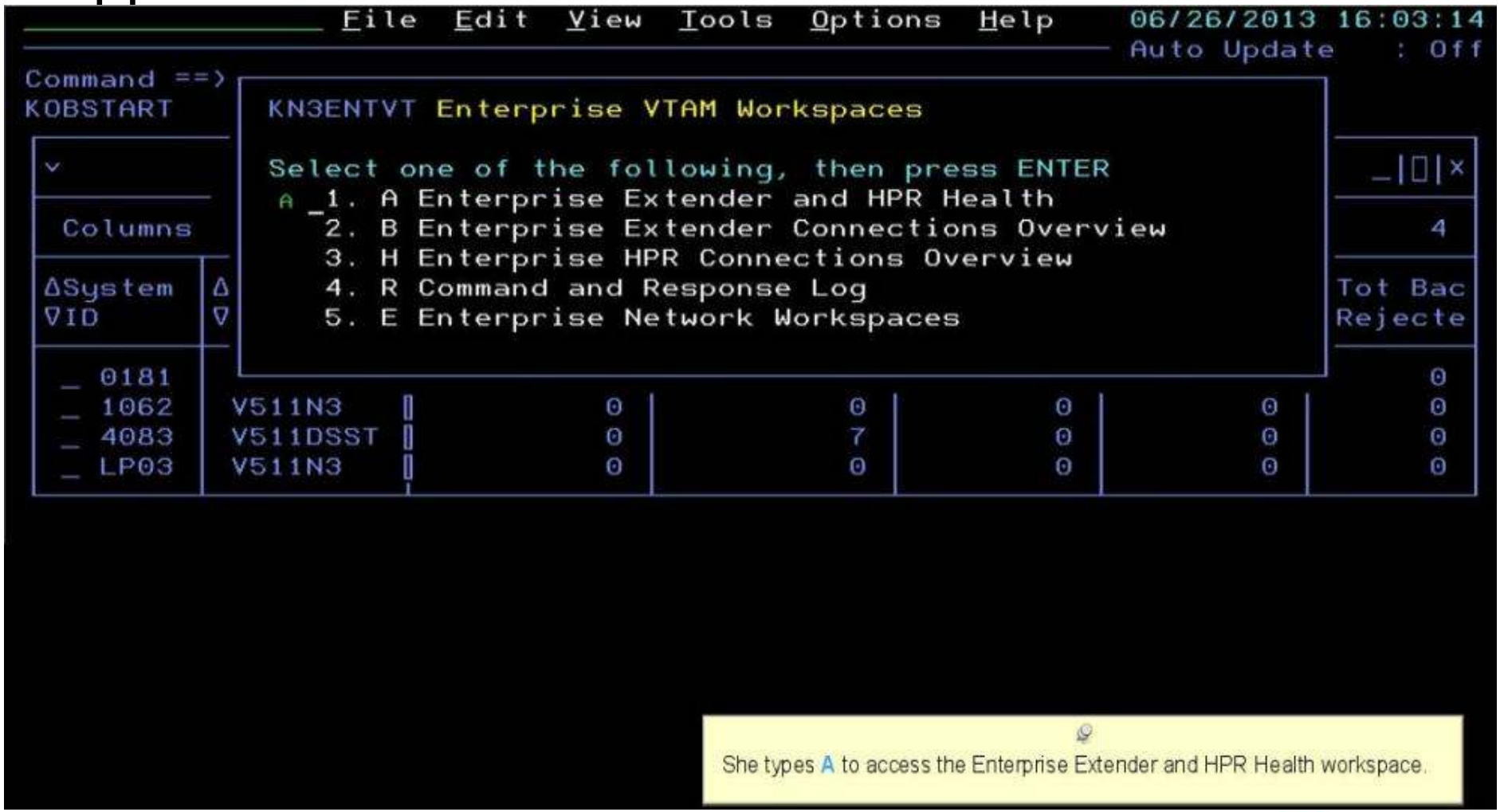

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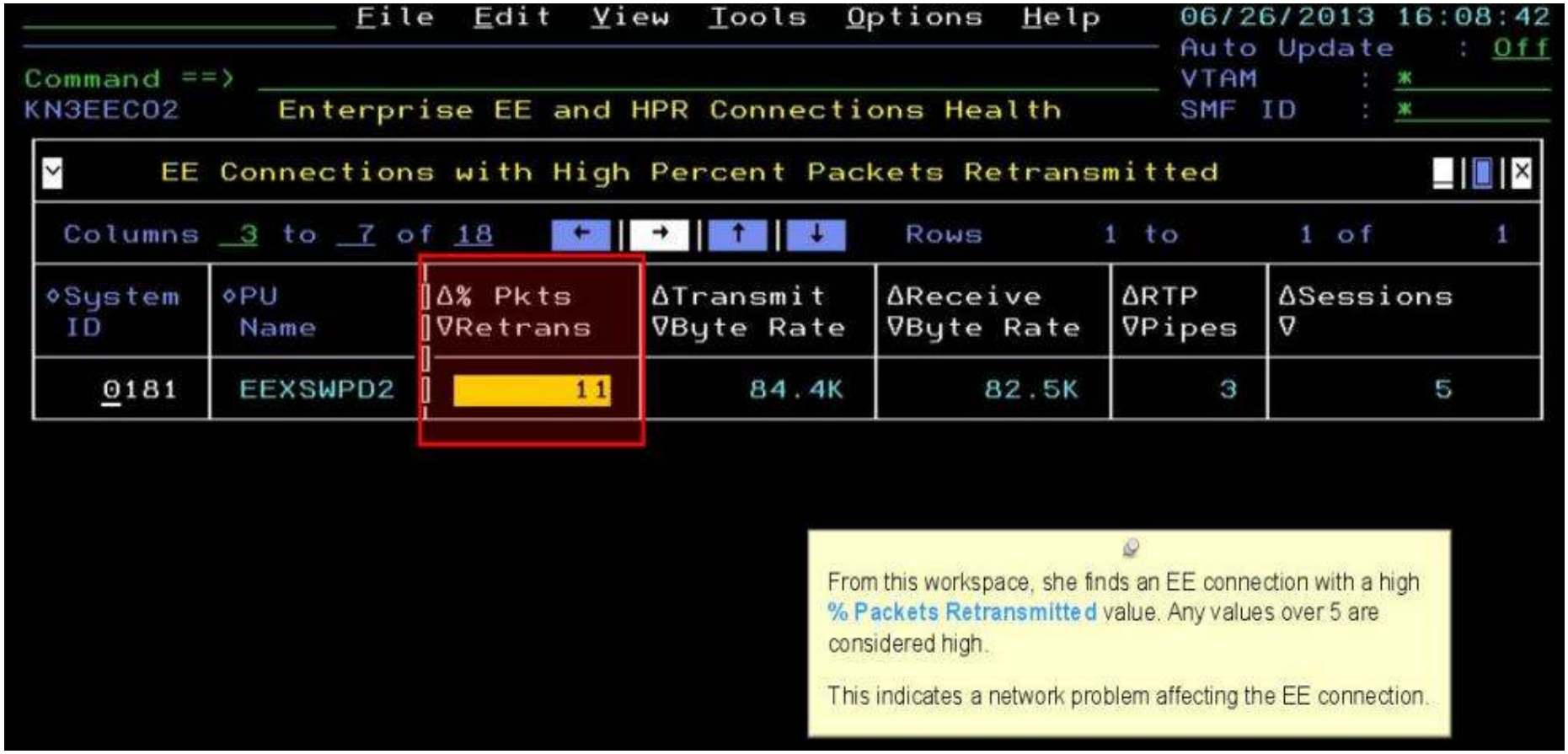

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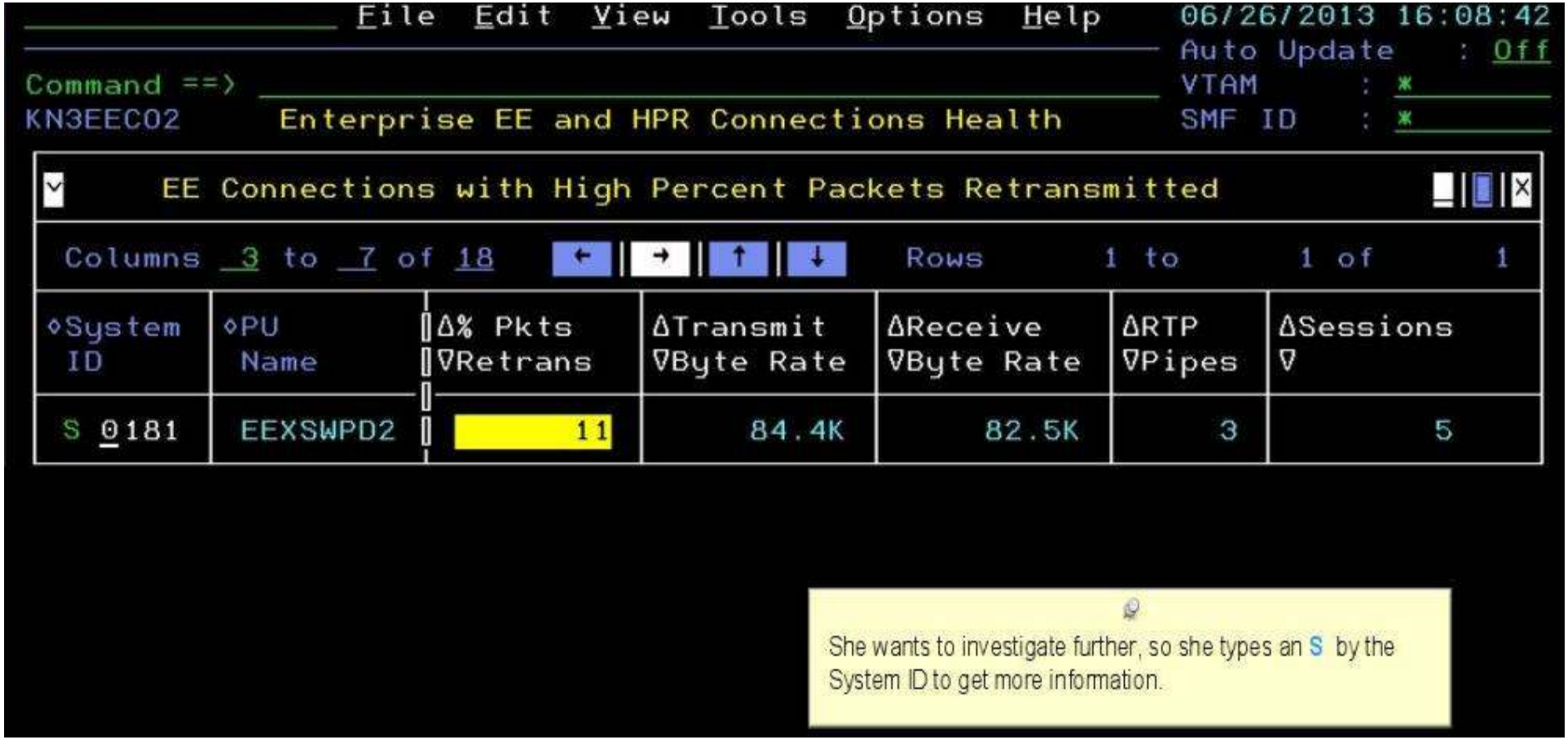

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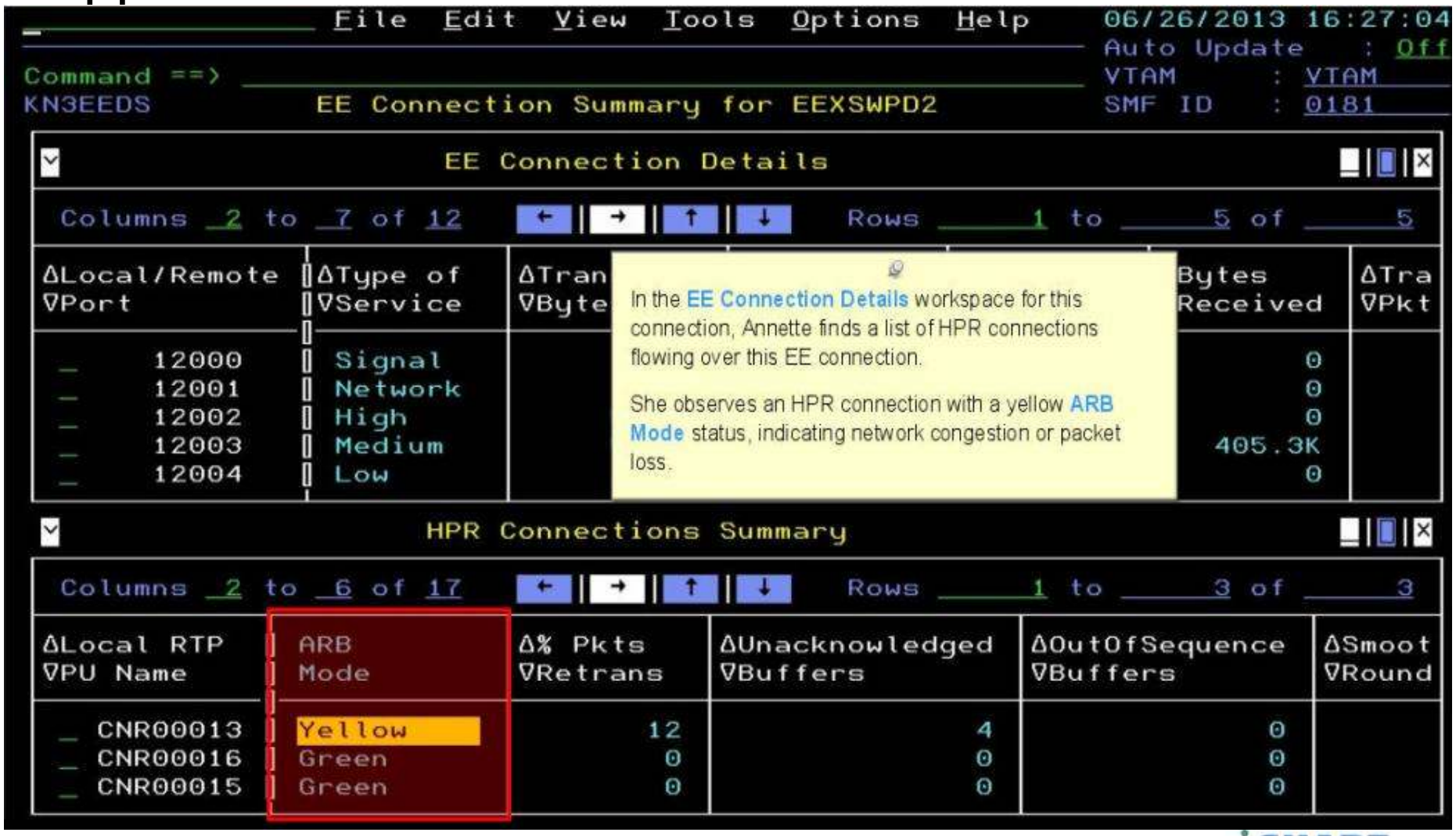

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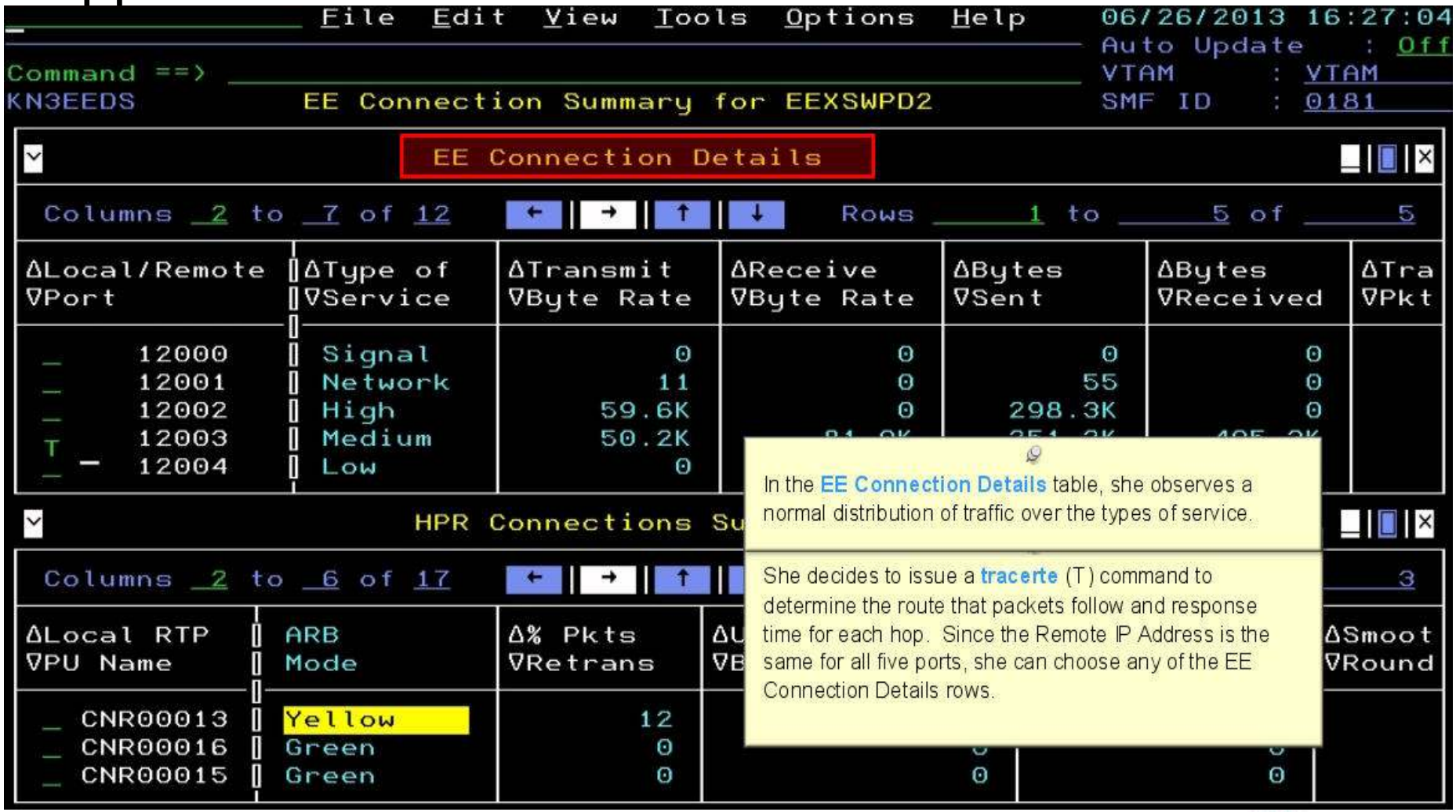

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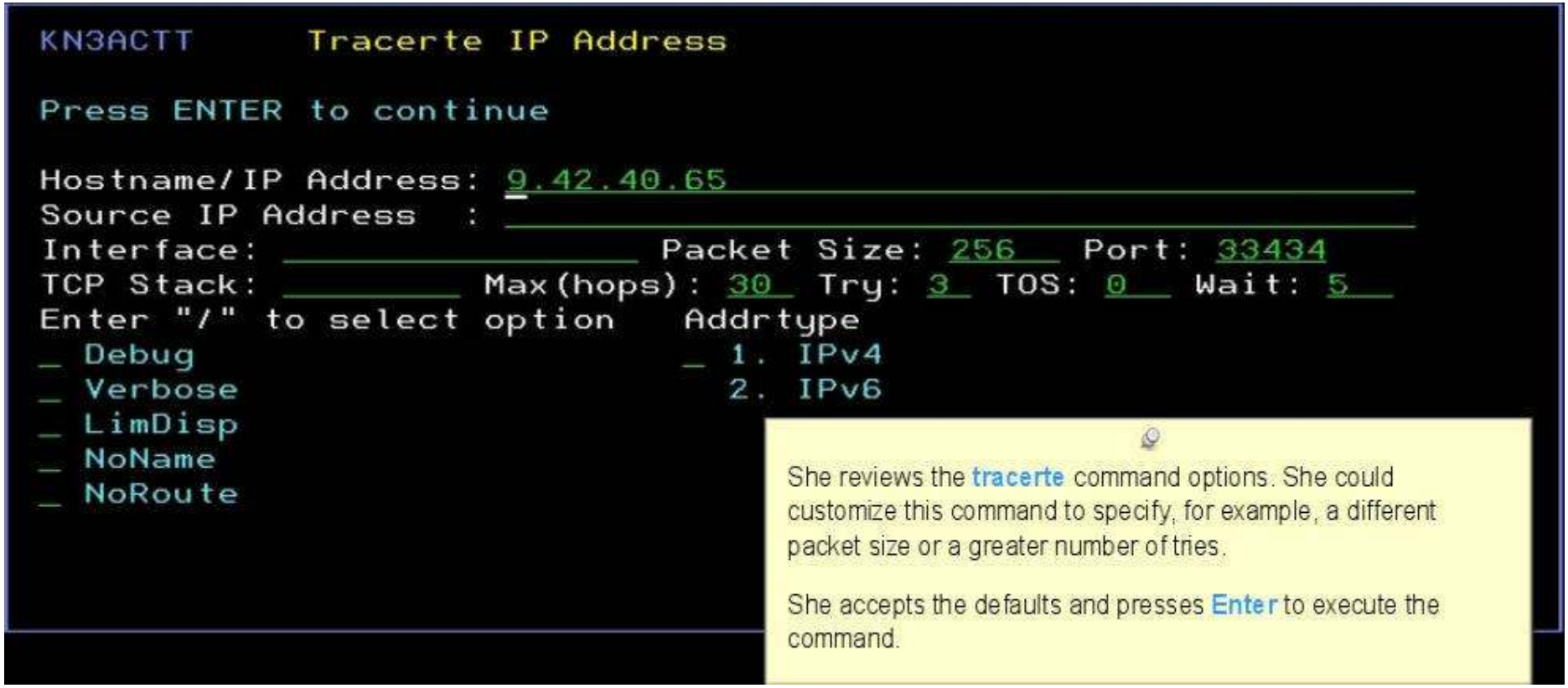

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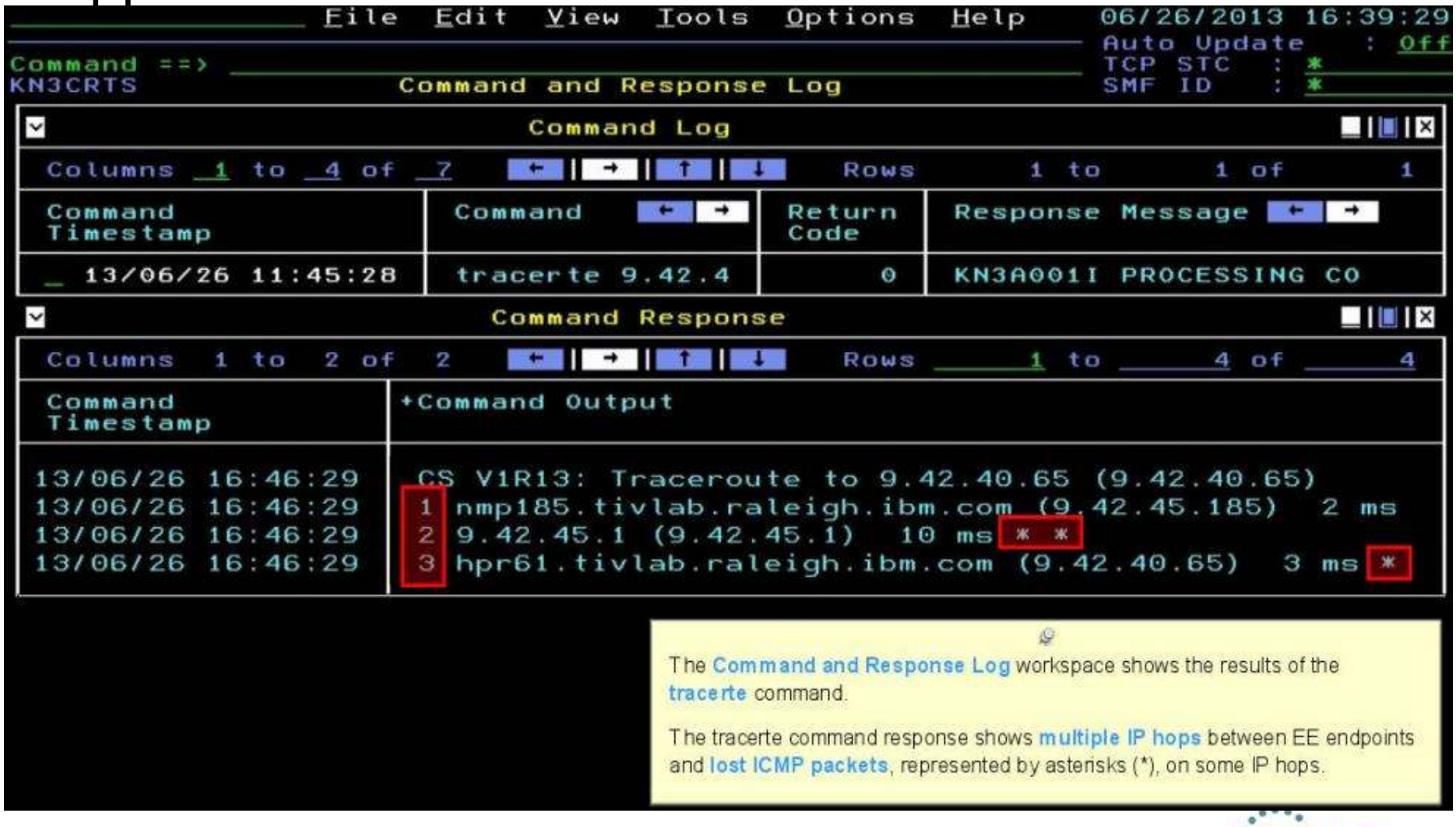


What is slowing down my business partner's applications?

Annette contacts her IT network support lead, Jim, to resolve the lost packets issue.

OMEGAMON XE for Mainframe Networks quickly identified the performance issues with enterprise extenders, so the problem could be resolved quickly and efficiently.

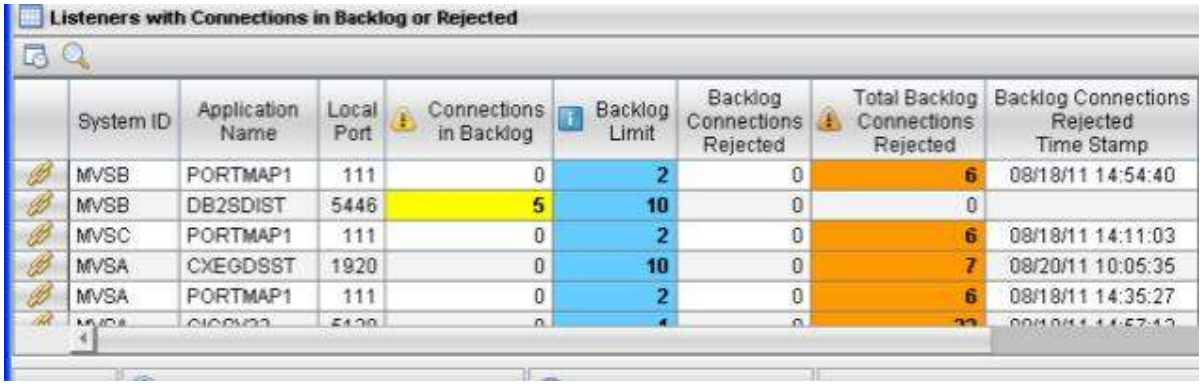
Scenario:
Scheduled logons and “silent” failures

The setting:

A mainframe network systems programmer was building a baseline for network performance of his LPARs and applications. A very high number of rejected connections were being reported by OMEGAMON XE for Mainframe Networks just after 10 pm each evening. At first, the systems programmer thought he had found a problem with the monitoring software.

Scheduled logons and “silent” failures

1. Johann, the network systems programmer, enabled a situation that e-mails him when backlog connections are rejected.



Listeners with Connections in Backlog or Rejected

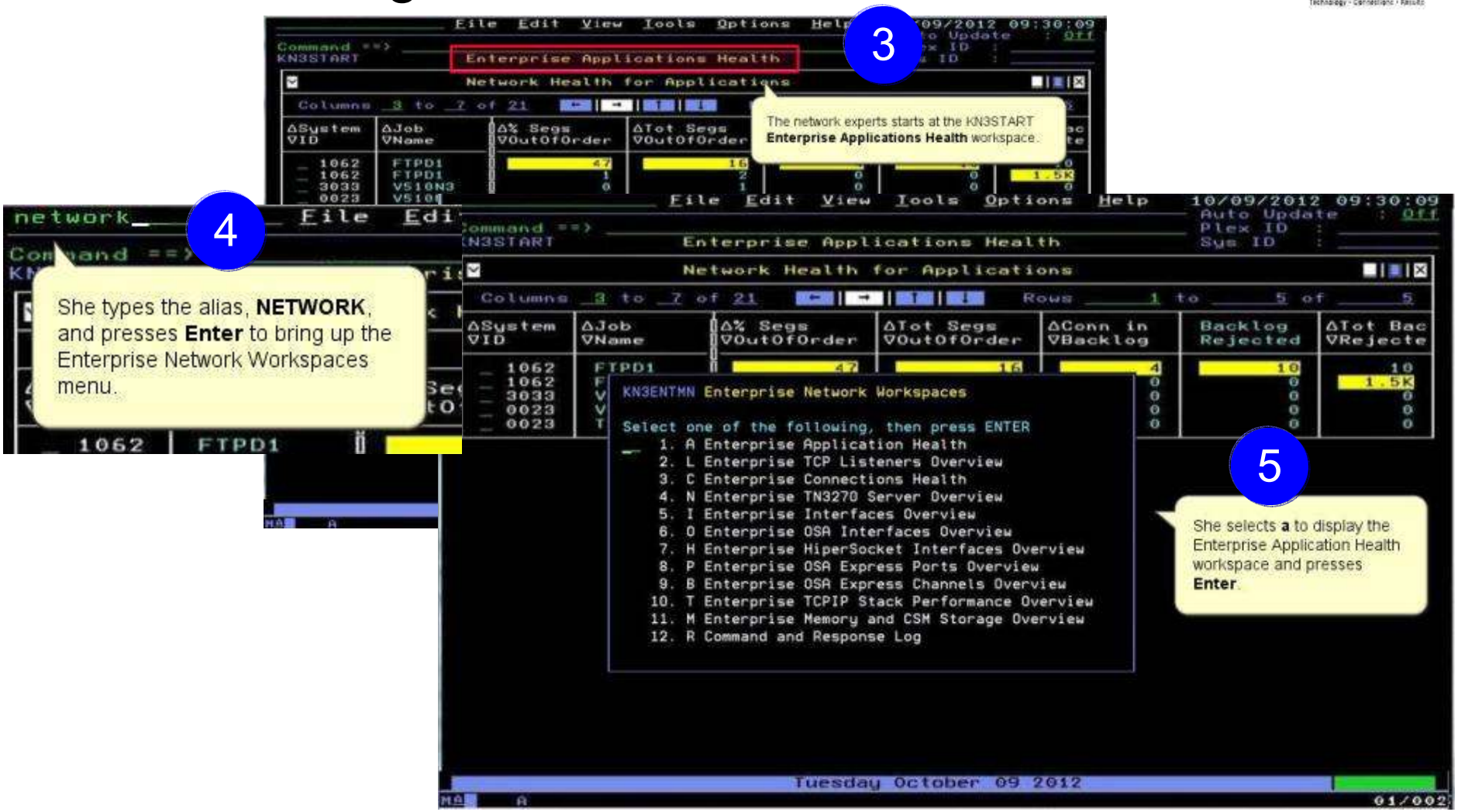
System ID	Application Name	Local Port	Connections in Backlog	Backlog Limit	Backlog Connections Rejected	Total Backlog Connections Rejected	Backlog Connections Rejected Time Stamp
MVSB	PORTMAP1	111	0	2	0	6	08/18/11 14:54:40
MVSB	DB2SDIST	5446	5	10	0	0	
MVSC	PORTMAP1	111	0	2	0	6	08/18/11 14:11:03
MVSA	CXEGDSST	1920	0	10	0	7	08/20/11 10:05:35
MVSA	PORTMAP1	111	0	2	0	6	08/18/11 14:35:27

2. The e-mails confirmed that thousands of connection requests were being rejected before the FTP server was able to accept.

BacklogConnsRejected - The number of rejected backlog connections for FTPD1 on SYSXX is **6,842**: 11/16/09 22:07EST.

BacklogConnsRejected - The number of rejected backlog connections for FTPD1 on SYSXX is **8,045**: 11/17/09 22:06EST.

Scheduled logons and “silent” failures …



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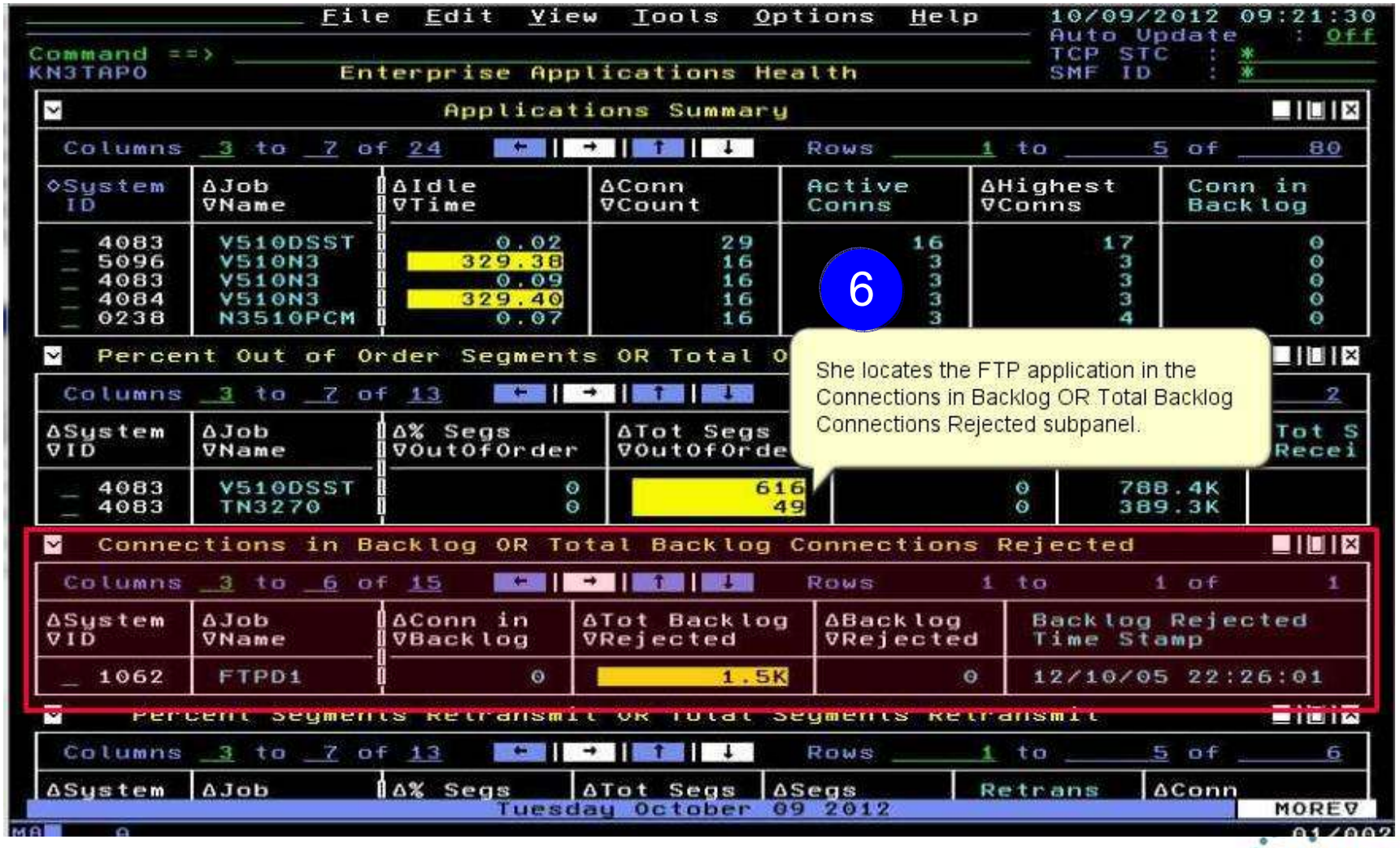

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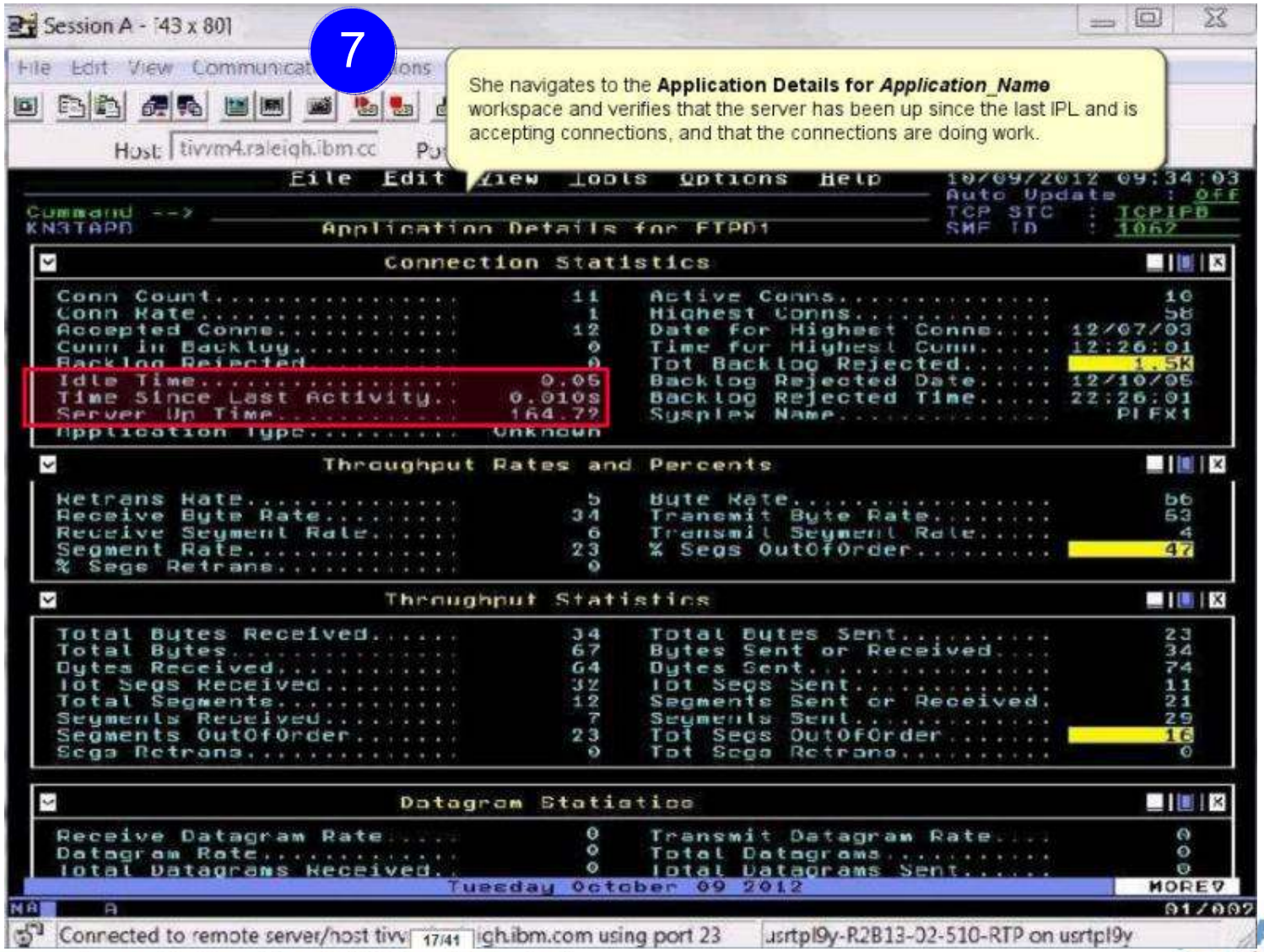

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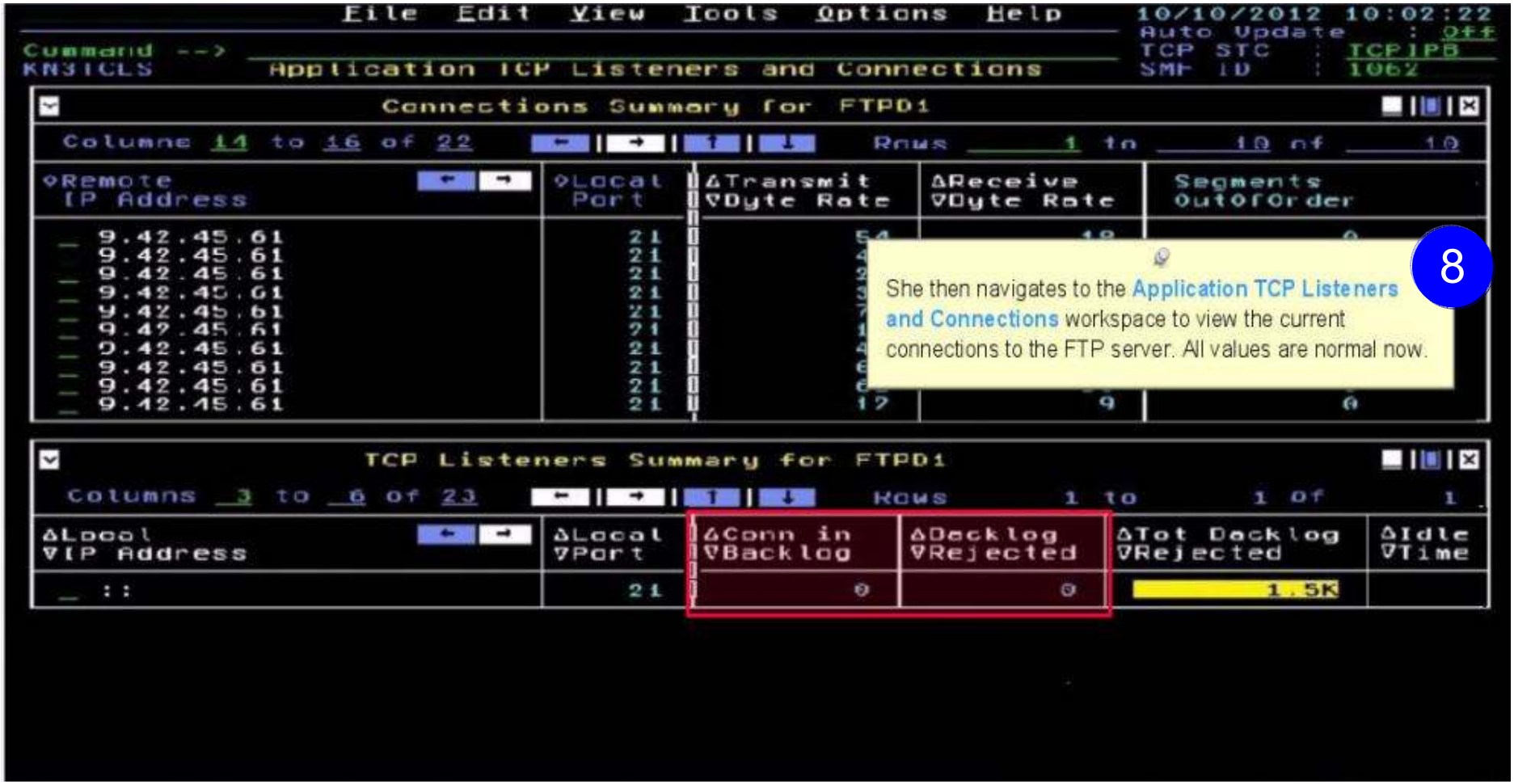


Scheduled logons and “silent” failures …

That evening starting at 10 pm, the FTP server was accepting connections as usual, but the backlog limit is quickly exceeded and subsequent connections are rejected.

9 The OMEGAMON operator again verifies that the FTP application is accepting connections, and the connections in backlog returns to zero by 10:30 pm. She calls the network expert to update her on the problem.

10 When she investigates further, the network expert finds that 10,000+ workstations all “wake up” at the same time and attempt to FTP files at 10pm every night.

12 She works with desktop support to roll out a change to the automated nightly timer, staggering the FTP connection requests over a couple of hours.

Scenario:
Spotting trends in abnormal connection count

The setting:

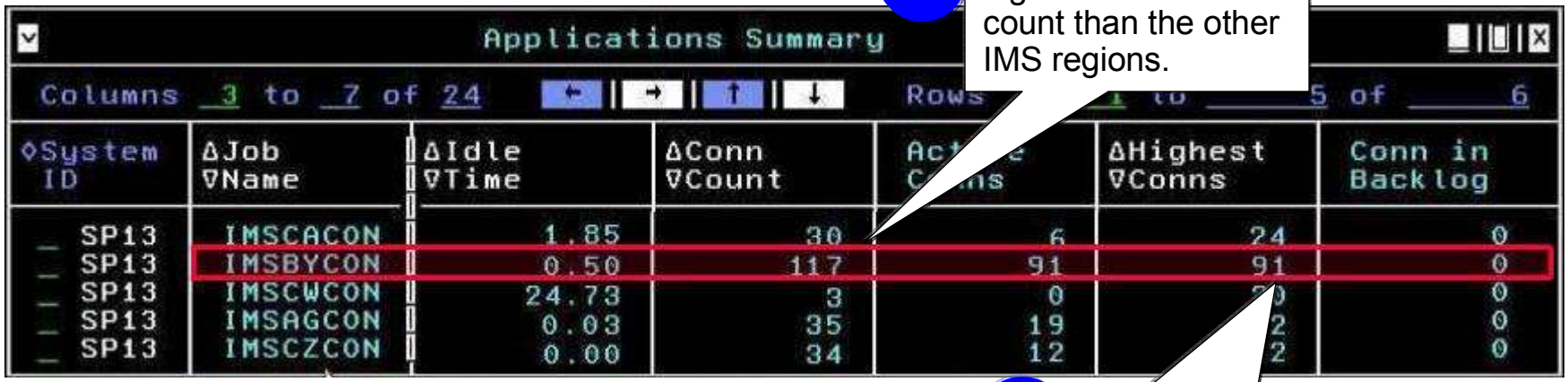
In this use case, a network systems programmer needs to identify the reasons behind slow, steady growth in the number of connections in one IMS region.

The network systems programmer navigates to the **Enterprise Applications Health** (KN3TAPO) workspace to view the IMS applications.

Spotting trends in an abnormal connection count …

Spotting trends in an abnormal connection count …

4



5 **IMSBYCON** has a higher connection count than the other IMS regions.

6 He contacts an IMS systems programmer who verifies that all the IMS regions, including **IMSBYCON**, are performaing work and no one has reported any connectivity issues.

7 There are no connections in backlog and the Idle Time shows that the IMS region is accepting connections

Spotting trends in an abnormal connection count …

8 He observes the IMS regions over time, watching the **Connection Count** increase while the **Idle Time** and **Connections in Backlog** remain in a normal range.

Friday:

IMSBYCON	0.50	227	140	140	0

Monday:

IMSBYCON	0.50	1228	1000	1000	0

9 He again contacts the IMS systems programmer.

By now, 1000+ connections are open, but not performing any work.

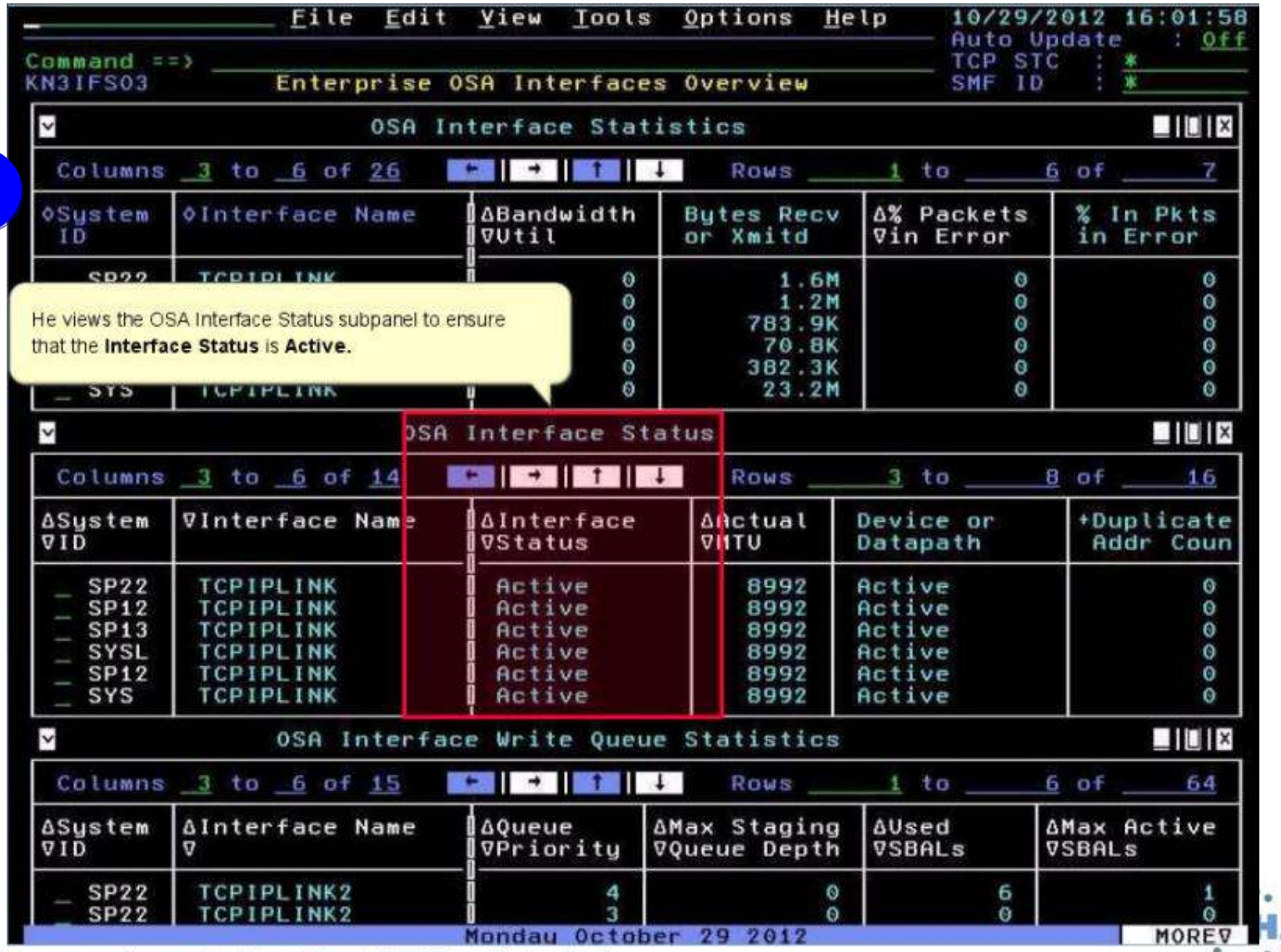
They determine that connections are being opened that are not being closed. The recycle IMS server to relieve the problem and the IMS programmer further investigates the IMS region.

Scenario:
Congested OSA Interface

The setting:

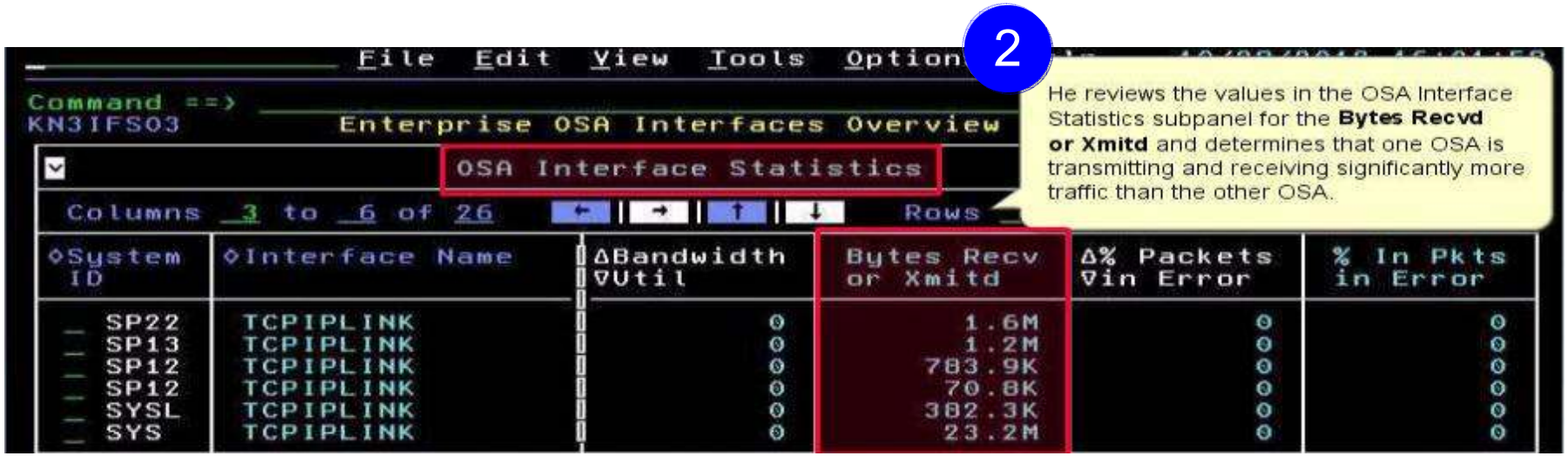
A systems programmer needs to quickly identify whether one OSA is processing a significantly higher volume of traffic than the other OSA on LPAR SP12. Traffic should be evenly distributed between the two OSA ports.

Congested OSA interface …



1

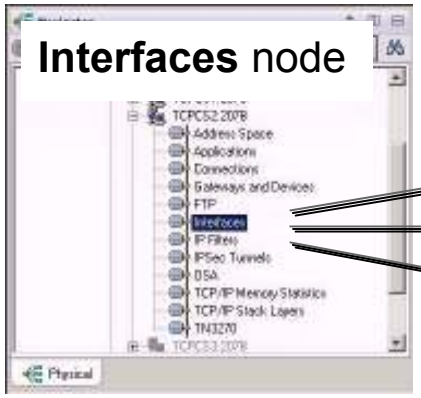
Congested OSA interface …



3 He issues a D TCPIP OMP RTTABLE command to display the main OMPROUTE table and determines that a first hop switch is congested for the non-productive OSA.

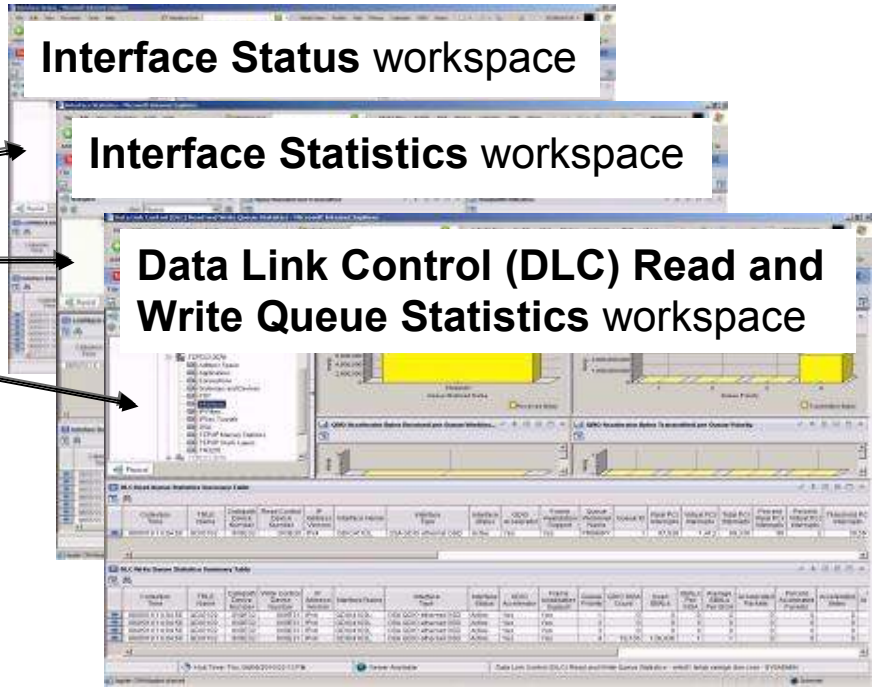
He contacts the enterprise networking team to resolve.

Improved Diagnostics and decreased CPU utilization

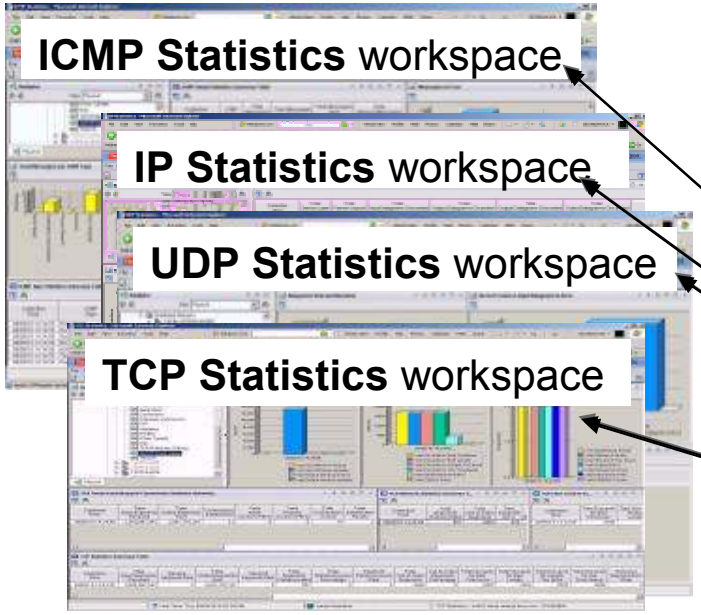


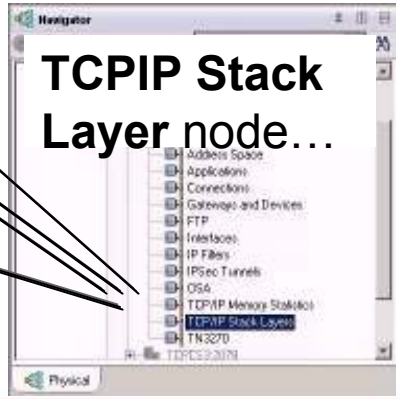
Source changed:

- Old: SNMP
- New: Callable NMI



Additional data collected





Improved Diagnostics and decreased CPU utilization

Gateways:

Gateways (Routing table) collected via IOCTL
- Lower CPU
- Reduce SNMP

Additional and improved routing information

Gateways

Collection Time	Network Address	First Hop	Link or Interface Name	Subnet Mask	Subnet Value	Link or Interface Status	Route Status	Route Type	MTU Value	Dynamic Route	Network Route	IP Version
08/05/10 13:54:56	172.17.0.0	<direct>	LCS4102L	255.255.0.0	172.17.0.0	Ready	Active	ICMP	1500	Yes	Yes	IPv4
08/05/10 13:54:56	127.0.0.1	<direct>	LOOPBACK	HOST	127.0.0.1	Ready	Active	Static	65535	No	No	IPv4
08/05/10 13:54:56	10.62.0.0	<direct>	IUTIQDFEL	255.255.255.0	10.62.0.0	Ready	Active	Static	8192	No	Yes	IPv4
08/05/10 13:54:56	10.93.2.2	<direct>		HOST			Active	Static	576	No	No	IPv4
08/05/10 13:54:56	10.11.7.2	<direct>	MPC417	H			Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.12.1.2	<direct>	MPC4212L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.3.2	<direct>	MPC4132L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.1.2	<direct>	MPC4112L	H			Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.2.7	<direct>	MPC4172L	H			Inactive	Replaceable Static	4096	No	No	IPv4

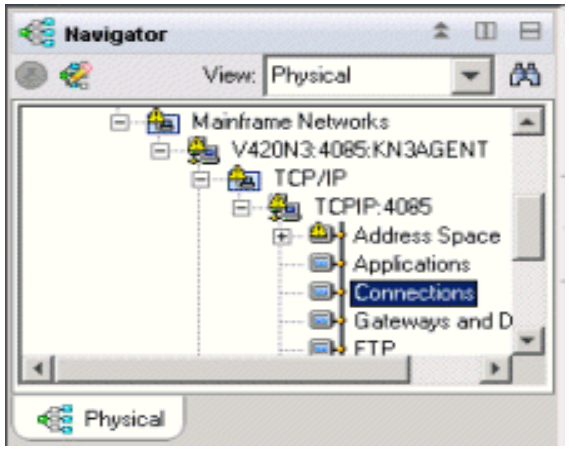
Dynamic Virtual IP Addresses (DVIPAs) reported in Gateways (formerly in Interfaces) table

OSA-Express:

- Speed diagnosis of OSA and interface problems by following links from OSA to Gateways or Interfaces workspaces
- Each instance of the monitoring agent does not need to collect OSA data for each instance of the monitoring agent in your environment
  - Collect OSA performance statistics from a single LPAR that is sharing the OSA adapter
  - OSA is the only data that is collected via SNMP. You may choose not to configure or run the SNMP daemon on systems where you do not collect OSA data

Improved Diagnostics and decreased CPU utilization

From **Connections** node…



- Connections
- UDP Endpoints
- TCP Listeners
- TCP Connections
- Application Connections
- Application UDP Endpoints
- Application TCP Listeners
- Application TCP Connections
- TCP Connections Link

Improve overall TCP/IP performance with additional visibility:

- Monitoring the sent and received data queued for TCP connections
- Monitoring Application Transport–Transport Layer Security (AT-TLS)
- Defining the Local Port attribute numerically (sorting)
- Displaying connection state for all connection types
- Enabling the remaining Connections node workspaces for product-specific Take Action commands

Support for zEnterprise mainframe server improves application availability

OMEGAMON XE for Mainframe Networks provides:

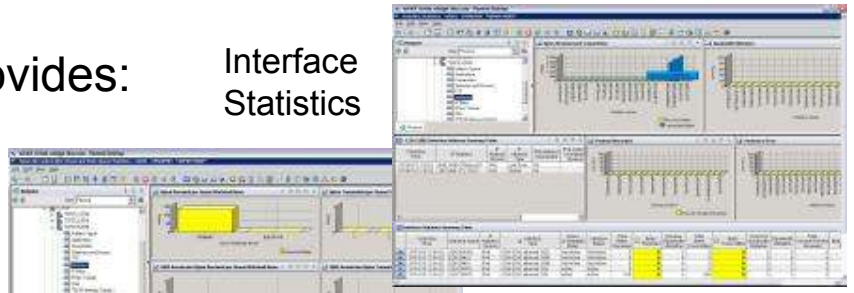
Visibility into the zEnterprise IntraNode Management Network (INMN) and zEnterprise IntraEnsemble Data Network (IEDN)

- Isolate and analyze traffic flowing over zEnterprise private networks

Visibility into z/OS applications and connections using the new zEnterprise Management Network with performance metrics that are useful in debugging problems

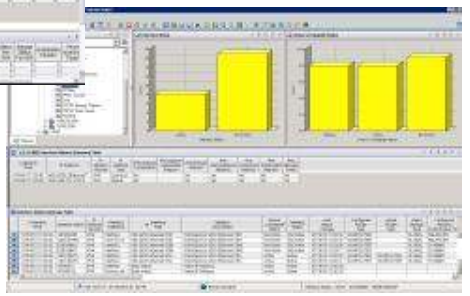
- Filter on Outbound Interface Name to show connections using the new INMN and IEDN interfaces

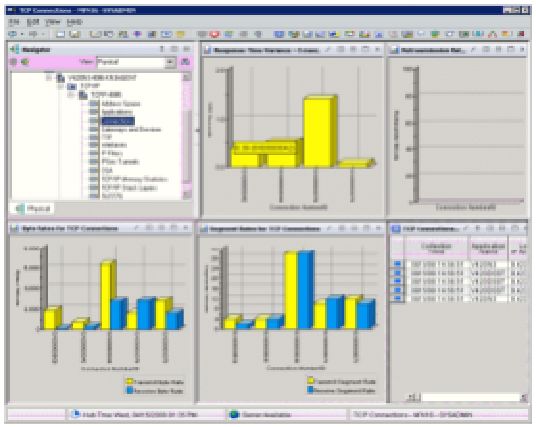
Interface Statistics



DLC Read and Write Queue Statistics

Interface Status





TCP Connections

Improved resource usage with more control over data collection

```
------------------ SPECIFY COMPONENT CONFIGURATION (Page 2)--------------
Command ===>

 Specify the following global information:

  OSA Statistics Collection:                              ==> Y  (Y,N)

  Interface Statistics Collection:                        ==> Y  (Y,N)

  Interface Data Link Control Statistics Collection:      ==> Y  (Y,N)

  TCP/IP Stack Layer Statistics Collection:               ==> Y  (Y,N)
```

Configuration Tool

The ability to turn data collection on and off is now available for the following types of data (at system and stack level):

- OSA Statistics
- Interface Statistics
- Data Link Control (DLC) Read and Write Queue Statistics
- Stack Layer Statistics

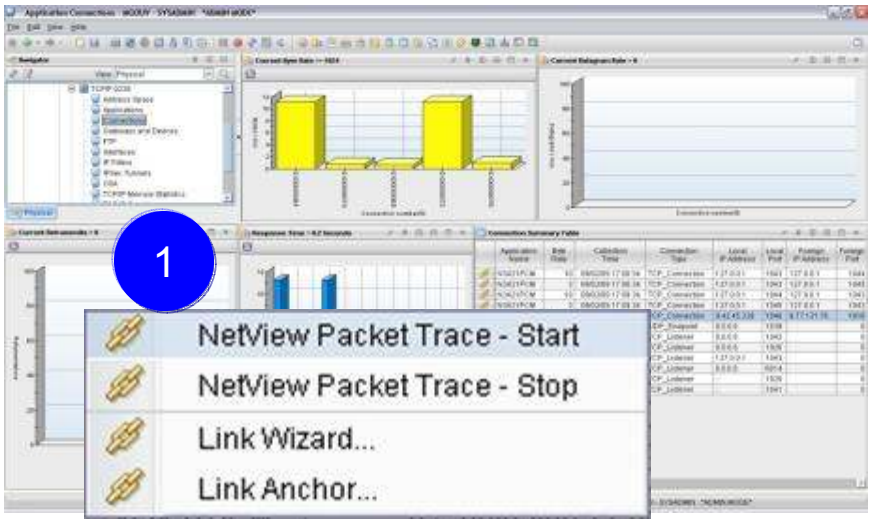
- Four new attributes for the four new configurable data collection options:

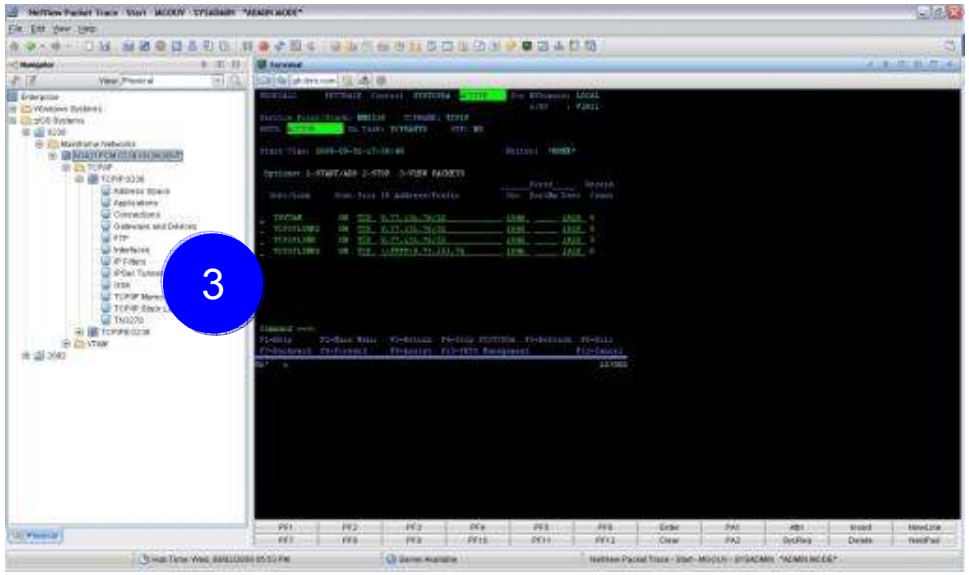
TCP Collector Status

Connections And Applications Collection	IP Security Collection	OSA Statistics Collection	Stack Layer Statistics Collection	Interface Statistics Collection	Data Link Control Statistics Collection	Routing Table Collection	Routing Table Collection Frequency	TN3270 Server Collection	TN3270 Data Display Interval	F Colle
Yes	Yes	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	No	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	No	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes

Greater synergy with IBM Tivoli NetView for z/OS

- Launch in context to start or stop a NetView packet trace
  1. Select TCP connection to trace
  2. Logon to NetView
  3. View packet trace definitions after link script completed

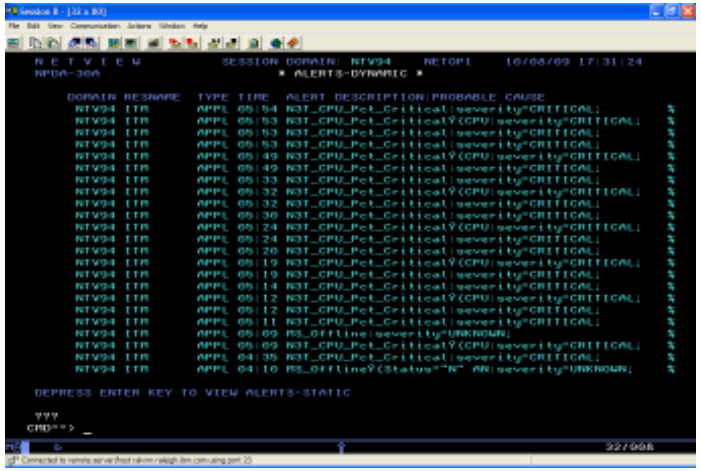


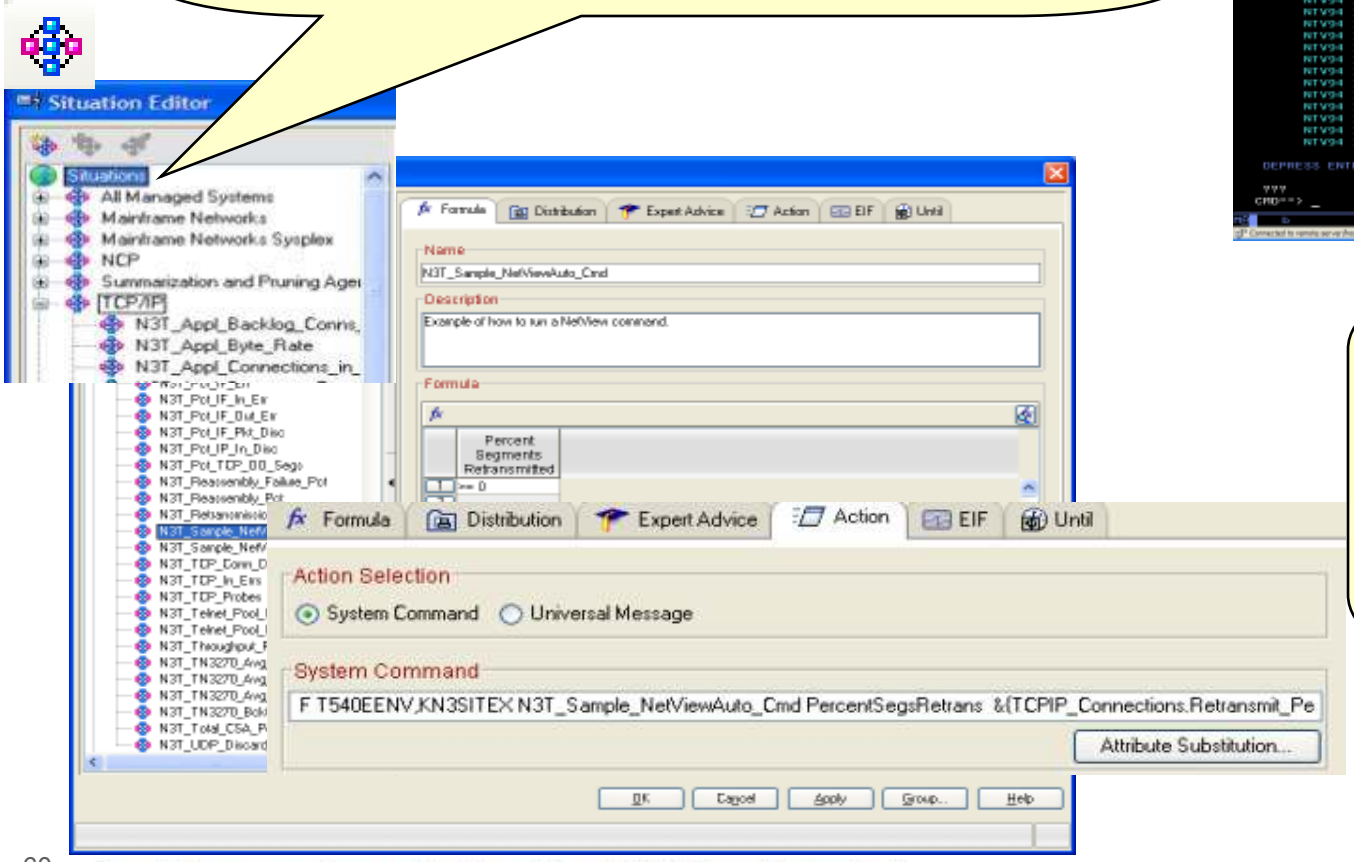


Greater synergy with IBM Tivoli NetView for z/OS

Sample situations trigger NetView for z/OS automation

- Execute command in NetView address space
- Send situation information in message





Sample NetView for z/OS automation

- Recognize messages
- Recognize situation events
- Parse message text
- Parse Situation event

Improved management through additional Take Action commands

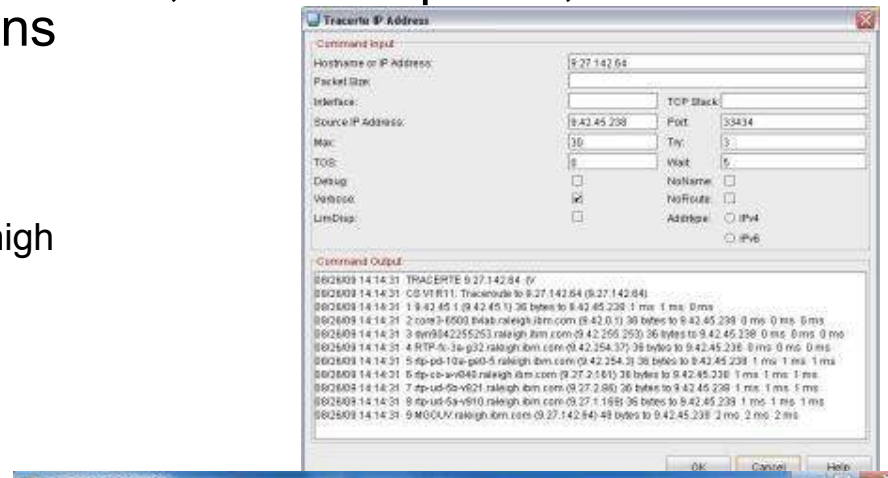
- NSLookup and Tracerte added to Ping and Drop
- Available for Connections, TCP Connections, UDP Endpoints, TCP Listeners, and TN3270 Server Sessions

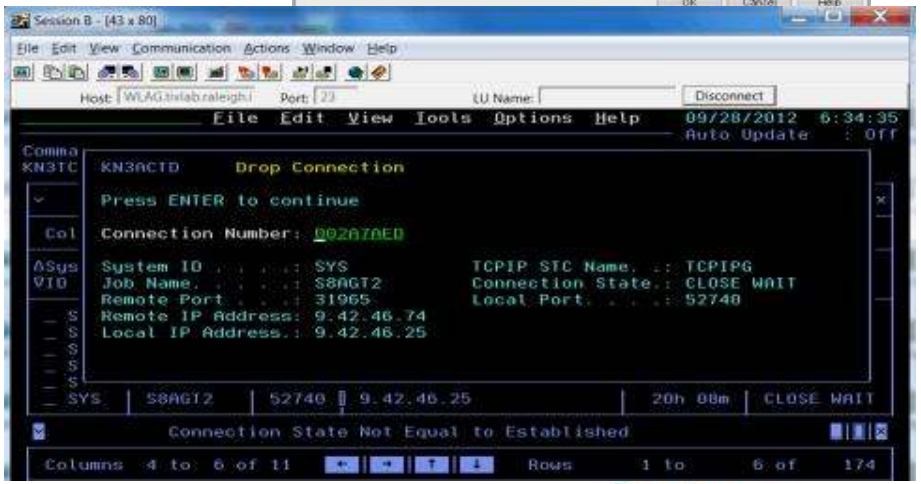
TEP Scenario:

- Situation alert created when connection experiences slow response time
- SME navigates to Connections workspace and sees high retransmission rate for a connection
- Is there high congestion in the network?
- Right clicks on the row for connection and choose Tracerte to display Tracerte dialog.
- Issues Tracerte to understand route between the two hosts and if router that is not working

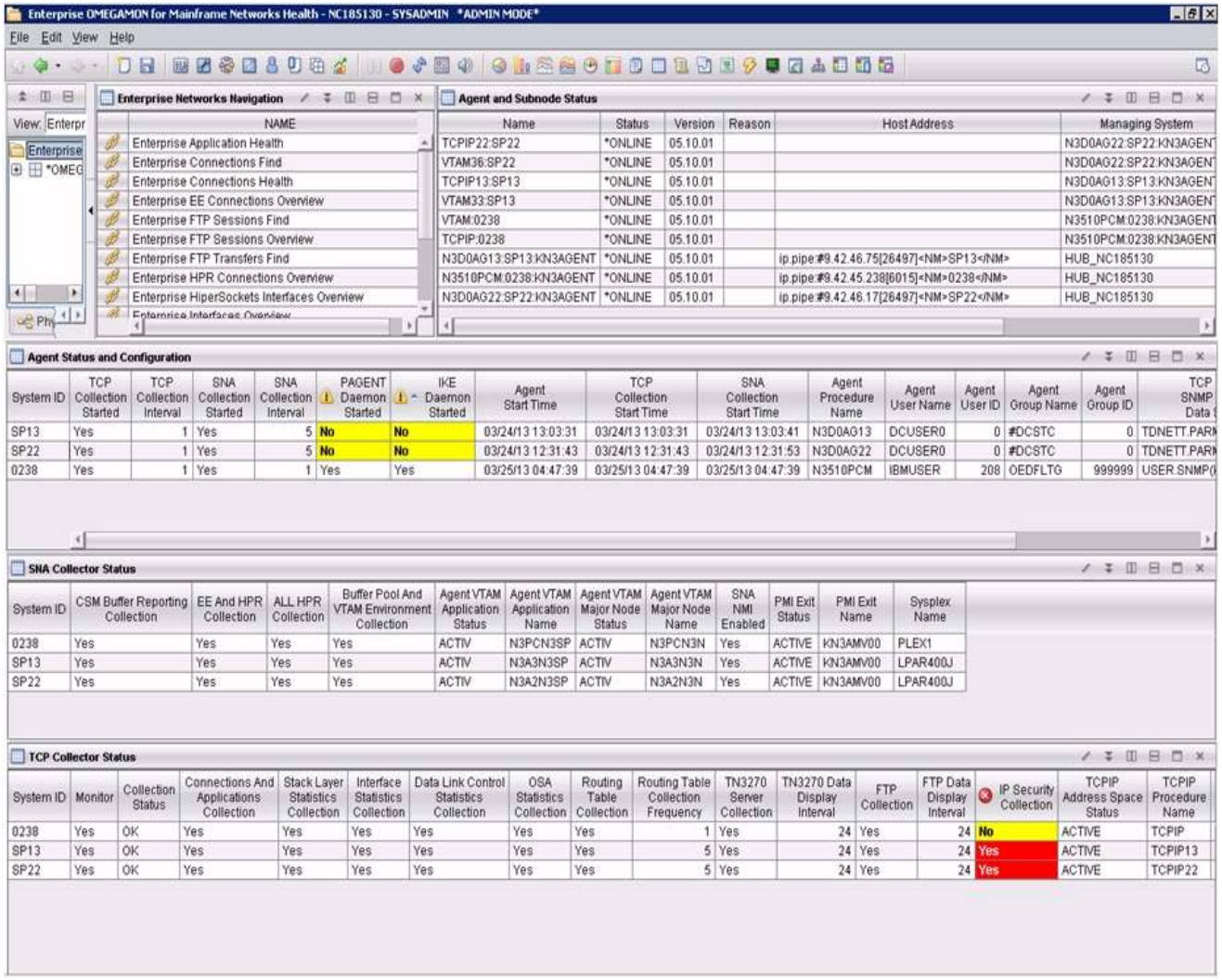
Enhanced 3270 Scenario:

- Situation alert created when connection experiencing slow response time
- SME navigates to Application TCP Listeners and Connections workspace and identifies connection
- SME types the "/" option to display a list of options
- Types "D" to display the Drop dialog
- Issues Drop and verifies connection dropped





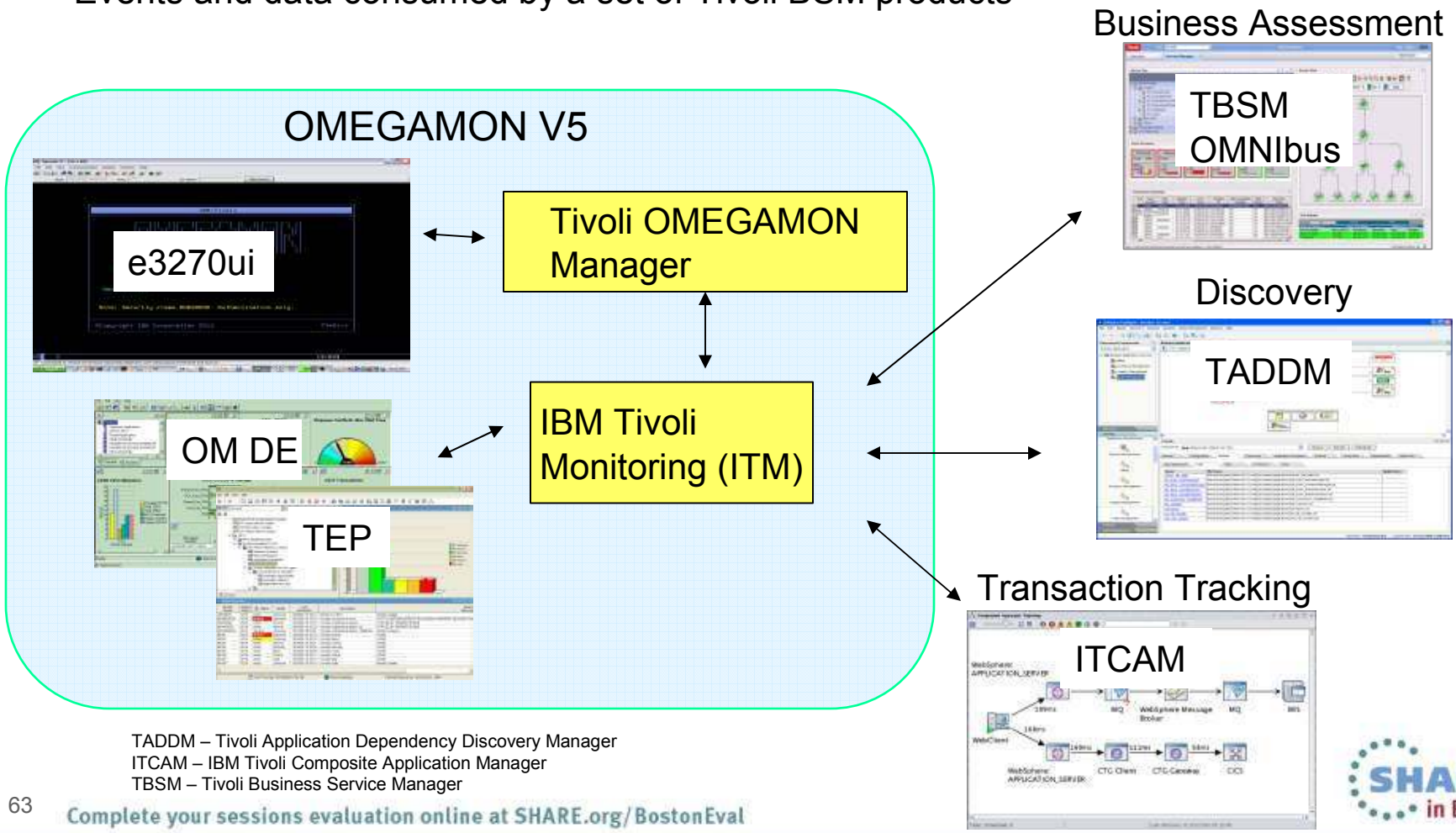
Improved troubleshooting of data collection problems



- Agent Status workspace provides configuration and status information about the agent and its data collectors.
- Troubleshoot data collection problems resulting in missing or incomplete data
  - After an install or upgrade
  - After the agent has been running for some time
- New attributes display status of data collection interfaces

OMEGAMON integrates within a total System z Business Service Management solution

OMEGAMON Portfolio provides performance and availability visibility for System z. Events and data consumed by a set of Tivoli BSM products



TADDM – Tivoli Application Dependency Discovery Manager
ITCAM – IBM Tivoli Composite Application Manager
TBSM – Tivoli Business Service Manager

Business success is directly dependent on the health of underlying IT systems, applications, and networks

- Complexity of today's enterprise environments demands solutions that integrate across the enterprise
- IBM in unique position to deliver monitoring and management solutions across enterprise subsystems, including mainframe network
- IBM Tivoli OMEGAMON XE for Mainframe Networks V5.1.1 is key to system and network availability and performance, providing Visibility, Control, and Automation

Learn about all recent Tivoli announcements and how to exploit them in sessions this week.

Monday
- 14073 – What's New in OMEGAMON (11:00)
- 14121 – OMEGAMON for Storage (4:30)

Tuesday
- 13903 – OMEGAMON Lab (9:30)
- 14074 – Automation Control (11:00)
- 14163 – OMEGAMON for Storage (4:30)

Wednesday
- 13295 – OMEGAMON for Networks (8:00)
- 13771 – Advanced Catalog Mgmt (9:30)
- 14076 – System Automation (11:00)
- 14089 – Storage Management (11:00)
- 14080 – Workload Automation (3:00)

System z Facebook page:
https://www.facebook.com/IBMsystemz
Twitter hashtag: #systemzsw

Thursday
- 13546 – NetView Canslog (12:15)
- 14345 – Lunch and Learn – Mike Baskey
- 14077 – OMEGAMON zAware support (1:30)
- 13545 – NetView Management (3:00)

Friday
- 14056 - OMEGAMON power user (8:00)
- 13824 - OMEGAMON for DB2 (9:30)
- 14082 – Capacity Management with TDSz

IBM System z Service Management critical for moving to Mobile, Big Data and Cloud

IBM continues to improve z/OS environment to support new technologies

- OMEGAMON family enhancements
  - OMEGAMON XE on z/OS V5.1.1
  - OMEGAMON XE for Mainframe Networks V5.1.1
  - OMEGAMON XE for Storage V5.2
  - OMEGAMON for z/VM and Linux V4.3
- IBM Automation Control for z/OS
- Workload Scheduler for z/OS v9.1
- Storage Management for z/OS portfolio enhancements

Learn More: http://www-01.ibm.com/software/os/systemz/itsm/

Follow us on Service Management Connect:
http://www.ibm.com/developerworks/servicemanagement/z/index.html

And, Mainframe Insights:
https://www-304.ibm.com/connections/blogs/systemz/?lang=en_us

Session 13295

What's New(er) for z/OS Network Performance Monitoring with OMEGAMON

Dean Butler
(butlerde@us.ibm.com)

YouTube videos of problem solving scenarios:
http://www.youtube.com/playlist?list=PLiD3_RDV00JcpfI2GCf2mPqprba2KZCsP

Reference

Product Documentation

- Document library: https://ibm.biz/Bdxknw
  - Common books: https://ibm.biz/BdxknU

- IBM Tivoli OMEGAMON XE for Mainframe Networks:
  - Planning and Configuration Guide, **SC27-4447**
  - New Enhanced 3270 User Interface Guide, **SC27-4450**
  - Tivoli Enterprise Portal User's Guide, **SC27-4446**
  - Troubleshooting Guide, **SC27-4448**
  - Parameter Reference, **SC27-4449**

- IBM Tivoli OMEGAMON XE and Tivoli Management Services on z/OS: Common Planning and Configuration Guide: **SC23-9734**

New IBM Tivoli OMEGAMON XE and Tivoli Management Services: Enhanced 3270 User Interface Guide: **SC22-5426**

Technotes

- OMEGAMON XE for Mainframe Network v5.1.1 GA technote:
  - https://ibm.biz/BdxknT
- High Availability z/OS Hub TEMS support Technote
  - http://www-01.ibm.com/support/docview.wss?uid=swg21326770
- Troubleshooting no data conditions on the OMEGAMON Enhanced 3270 User Interface
  - http://www-01.ibm.com/support/docview.wss?uid=swg21610269

Community, Forum, Wiki

- OMEGAMON XE for Mainframe Networks Community/Forum Support Site:
  - http://www-01.ibm.com/software/sysmgt/products/support/R118663G41228S30-community.html
- Tivoli System z Monitoring and Application Management:
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/Tivoli%20System%20z%20Monitoring%20and%20Application%20Management/page/OMEGAMON%20XE%20for%20Mainframe%20Networks
- OMEGAMON XE for Mainframe Networks Wiki:
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/Tivoli%20System%20z%20Monitoring%20and%20Application%20Management/page/OMEGAMON%20XE%20for%20Mainframe%20Networks
- Service Management Connect:
  - https://www.ibm.com/developerworks/servicemanagement/